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May 1989

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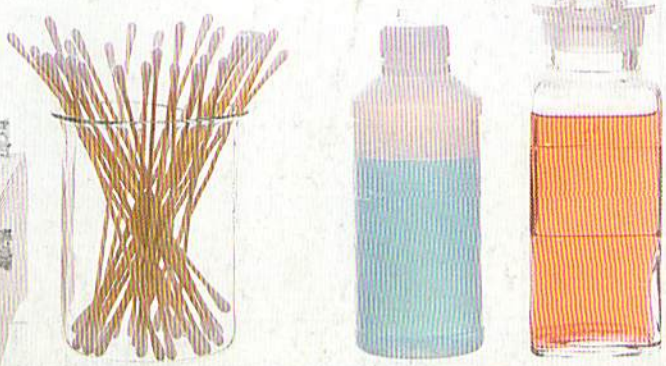

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EDITOR'S notes

Mark Raymond of Santa Barbara, California, recently wrote us and asked how we go about soliciting programs and then deciding which ones to publish. This is a topic we've never approached in these pages, and it's an area of our business that most of you would find very interesting. To get a clear picture, you need a brief glance at the past. So, first, a bit of history.

When we debuted *Gazette* in 1983, we followed the tradition of our flagship magazine, *COMPUTE!*, by publishing programs—both listings and documentation. The VIC-20 had a large installed base at that time, and we were swamped with VIC submissions. Months later, as the 64 became a hot mass-market item, we received hundreds of 64 programs in the mail each *week*. By early 1984, *Gazette* was known in the Commodore community as *the* place to go with your homemade programs. Aside from the VIC's demise and the improved quality of 64 programs, not much has changed since that time except quantity. We now receive far fewer submissions, about 30–40 per week; in 1984, we received up to 300 a week.

When the number of submissions first began to diminish appreciably (last year), I talked to a few of our reliable authors who had mysteriously stopped sending us programs. Several of them were simply burned out from programming, some moved to different machines—notably PCs and Amigas—and a few were deeply involved in noncomputing pursuits. Fortunately, we still have a number of good, dependable programmers as well as some terrific in-house talent.

The system we use in evaluating and purchasing programs goes like this. All programs are received by David Hensley, our submissions editor. Dave, an astute 128 and 64 user and programmer, looks at everything closely. He siphons off the programs full of bugs, those too narrow in focus ("Bowling League Secretary," for example), and those with bloated code (a simple shoot-'em-up that eats up 20K, for instance). This process eliminates about 60 percent of the submissions.

Dave next takes a hard look at the remaining programs. He applies several criteria to this phase: overall appeal, concept (originality and usefulness), size and quality of code, speed, graphics, sound, playability (for games), requirements (obscure hardware needed?), and printer compatibility, if appropriate. Another important factor—and a few decent programs have been rejected at this point—is redundancy. Does the program conceptually or functionally repeat something we recently published? Dave ends up with several programs that get a closer look.

Gazette assistant editors Rhett Anderson and Randy Thompson join me two to three times a month to look at the programs Dave recommends we buy. Our committee of four makes the final decision. Most often we arrive at a quick consensus.

The next decision is price. We look at program complexity, length, language, and overall appeal. Price, too, is a consensus decision.

At this point, Dave sends the accepted programs to Troy Tucker, who thoroughly tests them. Once a program checks out, a contract is mailed to the author. If there's a problem (say, an elusive bug), we fix it or write to or call the author for a solution. Almost all authors solve any problems within a few weeks.

Once a program makes it into a working table of contents, it goes through another vigorous testing process by members of the technical department, who, being both good writers and editors, augment, clarify, and edit the documentation. It is again tested by Troy before it moves on to the editors.

There are even more steps in the testing process, but further details would serve only as a prescription for insomniacs.

If you write 64 or 128 programs and think they're up to snuff, send them along. We'll put your code through the ropes. And if your program makes it, you'll be well rewarded. Our rates are competitive, and the follow-up disk royalties are up to five times greater than the initial payment.

Lance Elko
Senior Editor

COMPUTE!'s GAZETTE

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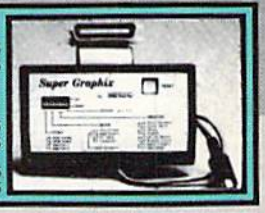

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LETTERS to the editor

Send questions or comments to Letters to the Editor, **COMPUTE!'s Gazette,** *P.O. Box 5406, Greensboro, North Carolina 27403. We reserve the right to edit letters for clarity and length.*

Arcade Contest Deadline

In the February issue, we announced a programming contest (p. 57) based on "The Great Arcade Machine," a program found in the same issue. We've already received several good games from readers. If you're developing a game for the contest, be sure to mark May 15 on your calendar. This is the postmark deadline for all entries. We'll announce the winners in the September issue and include the winning programs on the Gazette Disk.

Programming Pros and Cons

I'm starting to learn programming on the 64 and would like some advice. What are the pros and cons of programming a 64? If this is not a good computer to learn on, what is?

Chris Olvera
APO, NY

You'd no doubt get a variety of opinions if you asked a variety of programmers. One opinion is that the 64 is an excellent machine for programmers because its design includes a built-in BASIC and a good screen editor—and it permits various levels of control over graphics and sound. Another point in its favor: There are many excellent books and programming tools available for the 64. Gazette *teaches programming on a regular basis in "BASIC for Beginners" and "Machine Language Programming." Millions of people have learned to program on the 64.*

Another opinion is that the 64 forces you to work with a limited—but arguably adequate—BASIC language, a slow disk drive, memory constraints, and a relatively slow microprocessor. The hardware limitations make it difficult to program in any structured language, such as Pascal, C, or even BASIC.

If you're going to learn to program in machine language, the 64 is a great choice because of the control afforded by its custom sound and graphics chips. If you want to stick with BASIC, consider a 128; its BASIC 7.0 is excellent—far superior to the BASIC 2.0 of the 64. For programming in a structured language like C, Pascal, or Modula-2, you should consider an Amiga or an IBM compatible.

Disk Subscribers: Check Your Labels

Occasionally we receive letters from readers who subscribe to both Gazette *and the* Gazette Disk *and wonder about the time lag between the day they get their magazine and the day they get their disk.*

Ideally, there should be no delay. Both parts are designed to arrive together, in the same package, and for a majority of subscribers, this is the case.

The key to having this system work correctly is in the mailing label. If the mailing address for the magazine subscription is exactly the same as that for the disk subscription, the computer matches them up and sends everything in one package. Otherwise, two mailings are made and delays sometimes result.

Readers currently receiving two mailings a month can resolve the problem by sending copies of both labels to our subscription service and requesting that the names and addresses be made identical. The address is

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The Truth, Please

Is it safe to make the following statements about the Plus/4 and 16?

1. There will never be a "Vampyre Hunter" or "MetaBASIC" published for the Plus/4.

2. The Plus/4 and 16 will spend the rest of their lives with this magazine in the "BASIC for Beginners" section.

3. Both machines are very near the end of their lives in this magazine.

Eric Resner
Markham, IL

For statement 1, the answer is yes. A response to statement 2 is to look for "Power BASIC" elsewhere in this issue. The last statement is a logical deduction, but not necessarily true. We have no current plans to totally *ignore the Plus/4 and 16. Our recent readership survey indicates that 7 percent of our readers have one of these machines—but looking more closely at the results shows that most of these people also have a 64 or 128. So, looking at our entire readership, we think it's best to give nearly 100 percent of our editorial space to the 64 and 128 users.*

Missing in Canada

After reading the "Writing It Right in French" letter in your February column, I wrote to Télémédiatique at the address given for the *Traitex 64/128* program. I was dismayed when my letter was returned saying that the company had moved and no forwarding address was given. Can you help?

Robert Borch
Brooklyn, NY

We had no luck in trying to track it down. Perhaps one of our Canadian readers could play detective and help us with some updated information.

$30 Richer

I was extremely pleased with your March issue. I was about to pay $30 for a calendar program, and then I received your magazine with the very program I wanted in it. Thanks! I really enjoy it.

T. K. Liechty
North Las Vegas, NV

Yes, it's a good calendar program, both functional and attractive. A number of readers, however, have had trouble with this program. We've received several letters attached to flawed printouts with lines missing, extra characters, and so on. We tested "Monthly Calendar" on the Commodore 1525, 1526, MPS-801, MPS-802, MPS-803, and MPS 1200 with perfect results. We also tested the program with the Star Gemini-II, Star NX-1000C, and Okimate 10—again, with perfect results. None of the printer interfaces that we tested (Micrografix MW350, Cardco G-Wiz, Cardco +G, and Tymac's The Connection) would print the calendar correctly when interfacing to an Epson MX-80 printer. With each of these interfaces, double-width characters were printed normally—messing up the vertical alignment of the rest of page. Unfortunately, we can't test a program with the dozens of printers and interfaces—and combinations thereof—that are available to Commodore owners. At best, we can make a program designed to print graphics work with Commodore printers and as many Commodore-compatible printers as we can access. **G**

COMPUTE!'s Gazette Author's Guide

Here are some suggestions which serve to improve the speed and accuracy of publication for prospective authors. *COMPUTE!'s Gazette* is primarily interested in new and timely articles on the Commodore 128 and 64. We are much more concerned with the content of an article than with its style, but articles should as be clear and well-explained as possible.

The guidelines below will permit your good ideas and programs to be more easily edited and published:

1. The upper left corner of the first page should contain your name, address, telephone number, and the date of submission.

2. If your article is specifically directed to one model of computer, please state the model name. In addition, *please indicate the memory requirements of programs.* The model name and memory requirements should appear in the upper right corner of the first page.

3. The underlined title of the article should be placed about ⅔ of the way down the first page.

4. Following pages should be typed normally, except that in the upper right corner there should be an abbreviation of the title, your last name, and the page number—for example: Memory Map/Smith/2.

5. All lines within the text of the article must be double- or triple-spaced. A one-inch margin should be left at the right, left, top, and bottom of each page. No words should be divided at the ends of lines. And please do not right-justify. Leave the lines ragged.

6. Standard typing or computer paper should be used (no erasable, onionskin, or other thin paper), and typing should be on one side of the paper only (upper- and lowercase).

7. If you are submitting more than one article, send each one in a separate mailer with its own disk.

8. Short programs (under 20 lines) can easily be included within the text. Longer programs should be separate listings. *It is essential that we have a copy of the program, recorded twice, on disk.* If your article was written with a word processor, we request that you include a copy of the text file on disk. If you include a copy of your article on disk, please save the article as plain text, without any special formatting characters or control codes. Most word processors provide an option for saving a document as plain ASCII text or in unformatted form. The disk should be labeled with your name and the title of the article. Disks need to be enclosed within plastic or cardboard mailers (available at photography, stationery, or computer supply stores). If possible, programs written in machine language or a compiled language should include source code (or an annotated disassembly if the program was written with a machine language monitor).

9. A good general rule is to spell out the numbers zero through ten in your article and write higher numbers as numerals (1024). The exceptions to this are: Figure 5, Table 3, TAB(4), and so on. Within ordinary text, however, the zero through ten should appear as words, not numbers. Also, symbols and abbreviations should not be used within text: Use *and* (not &), *reference* (not ref.), *through* (not thru).

10. For greater clarity, use all capitals when referring to keys (RETURN, CTRL, SHIFT), BASIC words (LIST, RND, GOTO), and the language BASIC. Headlines and subheads should, however, be initial caps only, and emphasized words are not capitalized. If you wish to emphasize, underline the word; then it will be italicized during typesetting.

11. Articles can be of any length—from a single-line routine to a multiple-issue series. The average article is about four to eight double-spaced, typed pages.

12. We do not consider articles which are submitted simultaneously to other publishers. If you wish to send an article to another magazine for consideration, please do not submit it to us.

13. *COMPUTE!'s Gazette* pays between $70 and $800 for published articles. In general, the rate reflects the length and quality of the article. Payment is made upon acceptance. Following submission (to Editorial Department, *COMPUTE!'s Gazette*, P.O. Box 5406, Greensboro, NC 27403), it will take from four to eight weeks for us to reply. If your work is accepted, you will be notified by a letter which will include a contract for you to sign and return. *Rejected manuscripts are returned to authors who enclose a self-addressed, stamped envelope.*

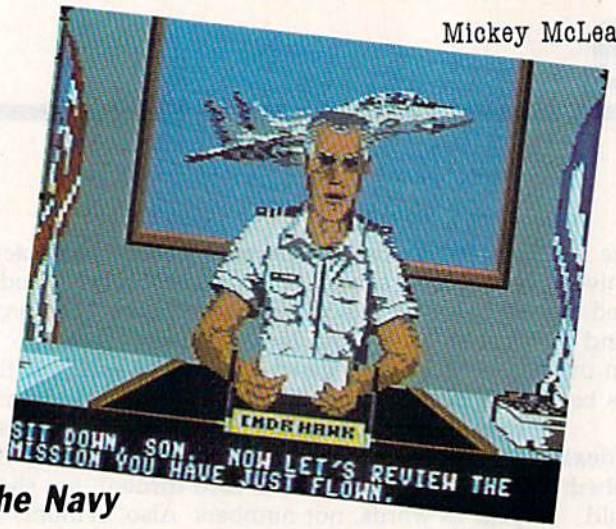
14. If your article is accepted and you subsequently make improvements to the program, please submit an entirely new disk and a new copy of the article reflecting the update. We cannot easily make revisions to programs and articles. It is necessary that you send the revised version as if it were a new submission entirely, but be sure to indicate that your submission is a revised version by writing *Revision* on the envelope and the article.

15. *COMPUTE!'s Gazette* does not accept unsolicited product reviews. **G**

COMMODORE CLIPS

NEWS, NOTES, AND NEW PRODUCTS

Mickey McLean



Join the Navy

Activision (Mediagenic, 3885 Bohannon Drive, Menlo Park, California 94025) has released *F-14 Tomcat* ($39.95), a Naval Weapons Fighter School simulation for the 64. The program's story line recreates the career of a Naval fighter pilot from the training program to the flying of actual missions.

Realistic simulated features include aerodynamic modeling, realistic acceleration and flight ceilings, loops and rolls, and, with a strong enough G force, the ability to experience blackouts and redouts. On-board weaponry includes a 20mm M61A1 Vulcan Cannon, Amraam air-to-air missiles, Sidewinders, and Phoenix missiles. A radio intercept officer keeps you up-to-date as to the location of enemies, and you have the ability to track six independent targets simultaneously, while a heads-up display shows altitude and airspeed.

You must first enlist in the game's Navy pilot-training program and learn to master the basics of aerial combat maneuvers. After you've qualified first in the T-2 Buckeye, you earn an assignment aboard the USS *Nimitz*. There are 80 randomly assigned missions during two tours of duty, and five theaters of action: the Persian Gulf, Central America, Libya, Korea, and Lebanon. You are then evaluated for admission into the Naval Weapons Fighter School.

The game includes a cast of characters ranging from a no-nonsense officer, Admiral Hawk, to wise-cracking squadron pilots to news anchor Chet Charles. You are required to navigate carrier takeoffs and landings with first-person, in-the-cockpit perspective. Enemy aircraft are displayed in full bit-mapped graphics. Between missions, you can take a break and choose rest and recreation at one of four different locations.

64 Holiday Sales Better Than Expected

Sales of Commodore 64 software were down during the 1988 holiday season, but were much better than expected, according to an article in *Software Industry Bulletin*.

MS-DOS titles accounted for the vast majority of sales, but major software manufacturers such as Epyx, Mediagenic, and Electronic Arts reported that Commodore titles are still steady sellers.

Epyx chairman David Morse was quoted as saying that sales of 64 titles were down but not as much as Epyx had forecast. Mediagenic CEO Bruce Davis agreed that Commodore games sold better than anticipated, while EA president Trip Hawkins described Commodore software sales as solid.

Record and Save

Epyx (600 Galveston Drive, P.O. Box 8020, Redwood City, California 94063) and the 3M Company have announced a joint promotion that features a coupon for Epyx's *Home Video Producer* ($49.95) inside specially marked boxes of Scotch EXG Hi-Fi Pro/Camera T-120 videocassettes.

Purchase of a Pro/Camera videocassette tape brings a $5 rebate toward a retail purchase of *Home Video Producer*, or a reduction in price is available through direct order from Epyx. The offer expires on March 15, 1990.

Home Video Producer can be used to personalize home videos shot with a camcorder. You can customize videos by choosing from the program's 75 full-color graphics, six full-screen scenes, eight borders, and ten typefaces. Special effects include wipes in nine directions and scrolls in four directions.

Lord British's Roots

Origin (136 Harvey Road, Building B, Londonderry, New Hampshire 03053) has announced the release of *The Ultima Trilogy* ($59.95), a collector's edition of *Ultima I, II,* and *III*. The packaged set contains the original three Ultima role-playing adventures authored by Richard Garriott (Lord British).

The trilogy chronicles the tale of the Triad of Evil and the battle to free the world of Britannia from this alliance. The package also contains a playbook, a reference guide, and maps.

COMMODORE CLIPS

NEWS, NOTES, AND NEW PRODUCTS

The Expanding World of MicroProse

Dozens of software companies have developed affiliate-label programs, but MicroProse (180 Lakefront Drive, Hunt Valley, Maryland 21030) has gone one step further by setting up a separate business entity, Medalist International. MicroProse, which markets mainly simulation programs, plans to sign up software companies having a diverse product mix.

At this writing, MicroProse has signed up three companies for the program: Software Simulations, a developer of statistically based sports games; Paragon Software, a maker of fantasy and adventure games; and Hewson Consultants, a British manufacturer that specializes in arcade games.

Known for its line of *Pure Stat* sports games, Software Simulations has announced several new products for the coming year. The company has already released the 1988 Tournament disks for *Pure Stat College Basketball* and, just in time for the upcoming baseball season, is releasing *Pure Stat Baseball II*. The new version features improved graphics and viewing perspectives. New statistical data has also been added, detailing figures for each major leaguer's clutch hits, injuries, fielding percentage, and throwing range.

In addition to its new line of Marvel comic games (see the March "Clips"), Paragon Software plans to introduce a line of software based on the Traveller science-fiction role-playing system.

Traveller 1: The Zhodani Conspiracy is set on a distant planet far in the future. The game uses both text and graphics and allows you to create and control up to five characters. All action within the game is governed as closely as possible by established Traveller system rules.

Known for its game *Uridium*, Hewson Consultants is one of the oldest computer-game companies in England. Its current list of products includes the games *Netherworld*, *Exolon*, and *Eliminator*.

The successful growth of MicroProse was noted by its inclusion in *INC. Magazine*'s "INC. 500," a listing of America's fastest-growing privately held companies. Ranked 72nd in the 1988 survey, MicroProse was the only recreational software company to make *INC.*'s list.

More for the 128

Free Spirit Software (P.O. Box 128, 58 Noble Street, Kutztown, Pennsylvania 19530) continues to support the Commodore 128 with two new software products—*Spectrum 128* and *ESP Tester*.

A full-featured paint program, *Spectrum 128* ($39.95) is designed to be used with the 128D or a 128 with a 64K video RAM upgrade. The program uses an 80-column display for 640 × 200 pixel resolution. All 16 standard colors can be displayed, with an additional 128 colors available through color dithering. *Spectrum 128* is menu-operated and requires a 1351 or compatible mouse.

Features include airbrush, erase, mirror, multicolor, block fill or erase, a pixel editor, a color editor, and a built-in slide show. The program uses 128 fast mode and offers support for the 1750 REU. It also supports 1541, 1571, and 1581 disk drives and offers support for most printers.

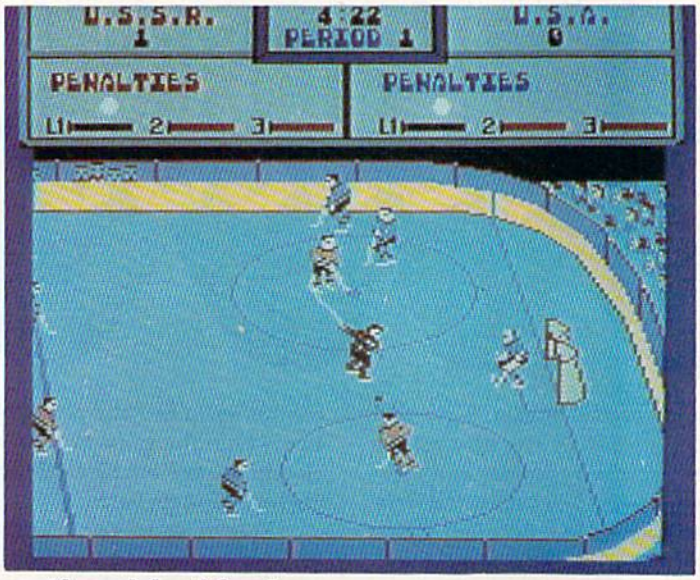
You can create hexagons, diamonds, octagons, lines, boxes, and circles. The program uses 8 × 2 color cells and allows you to create three-dimensional solids. Font sizes can also be adjusted. The text portion of the program includes reverse, underline, sideways, mirror, flip, complement, and pattern modes.

Spectrum 128 is compatible with *BASIC 8* files, *The Print Shop* graphics, *Sketchpad 128* graphics, and *News Maker 128*.

Another new product for the 128 from Free Spirit is *ESP Tester* ($24.95), designed to evaluate your powers of extrasensory perception. Evaluated characteristics include precognition, clairvoyance, and telepathy. Your ability to predict events or mentally transmit data is evaluated and then compared to your chances of randomly guessing the correct answer. If your score is consistently higher than the one determined by chance, the program presumes that you have a degree of ESP.

COMMODORE CLIPS

NEWS, NOTES, AND NEW PRODUCTS



International Incident

Two of the world's sports superpowers meet on the computer ice in a new sports/action game, *Powerplay Hockey: USA vs. USSR* ($24.95), from Electronic Arts (1820 Gateway Drive, San Mateo, California 94404).

You can choose from three levels of play and decide whether to play one-on-one or five-on-five team competition. Defensive and offensive moves such as slap shots, drop passes, and body checks can be executed, and fights can break out if the action becomes too intense.

Playing options in this one- or two-player game include the choice of an American or a Soviet team and choosing a difficulty level ranging from Junior to the more challenging Olympic level.

A stat screen at the end of each period shows attempted shots and made shots for each player. You can also select period lengths of 2, 8, or 20 minutes.

Online Gamer's Forum

CompuServe (5000 Arlington Centre Boulevard, P.O. Box 20212, Columbus, Ohio 43220) has announced the addition of the Game Vendors Forum to the CompuServe Information Service. The new service is designed to provide support for computer-game players from publishers of those games.

The forum offers 24-hour online product support from selected manufacturers. Participating software companies include Electronic Arts, Sierra On-Line, Spectrum HoloByte, SubLOGIC, Mindscape, and Activision (Mediagenic). Users' questions, comments, and requests are fielded by the companies' customer-support representatives, designers, and other technical staff via the forum's message board. Forum members can also download and try games at no additional charge.

The forum is divided into three main areas: messages, libraries, and conferencing. Each company has its own message section for correspondence with customers, and a library which contains programs and text files.

Forum members can also exchange game hints or converse with other game players through the message board and online conferences.

CompuServe requires no additional charge to join the forum. Also offered is the Gamer's Forum, dedicated to the exchange of hints and player-to-player help for games.

Faster Processing

Turbo Master CPU ($179), from Schnedler Systems (25 Eastwood Road, P.O. Box 5964, Asheville, North Carolina 28813), is a 4.09-MHz accelerator cartridge that includes an on-board replacement microprocessor. It plugs into the expansion port of the Commodore 64, providing a processing speed four times faster than normal.

The cartridge contains turbo disk routines in ROM to make disk load and save operations five times faster; it also contains a DOS Wedge in ROM. Designed to speed up screen graphics and accelerate scrolling in word processors, the Turbo Master CPU also provides faster search-and-replace and insert operations.

Turbo Master CPU has a ten-day "satisfaction or your money back" guarantee.

Not-So-Slow Turtles

New Yorkers, beware! Ultra (Konami, 240 Berry Street, Wood Dale, Illinois 60191) has released *Teenage Mutant Ninja Turtles* ($29.95), featuring creatures with a perfected knowledge of the martial arts.

You must help the turtles battle against the most dangerous criminal mind in the history of the free world, the evil Shredder and his Foot Clan. The turtles—Leonardo, Michelangelo, Donatello, and Raphael—have sworn to fight the Shredder and have armed themselves with sais, nunchakus, Katana blades, and other ninja weapons.

The game is based on the popular animated television series, which has spawned comic books, a line of action figures, and a variety of games, puzzles, and coloring books. G

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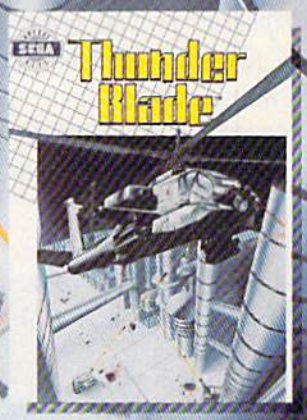

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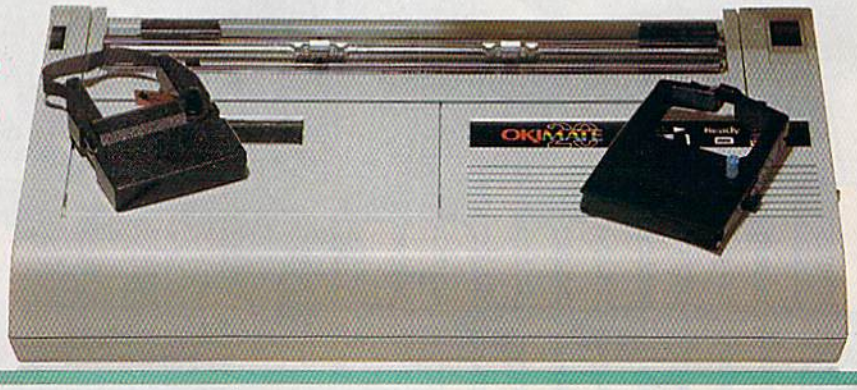
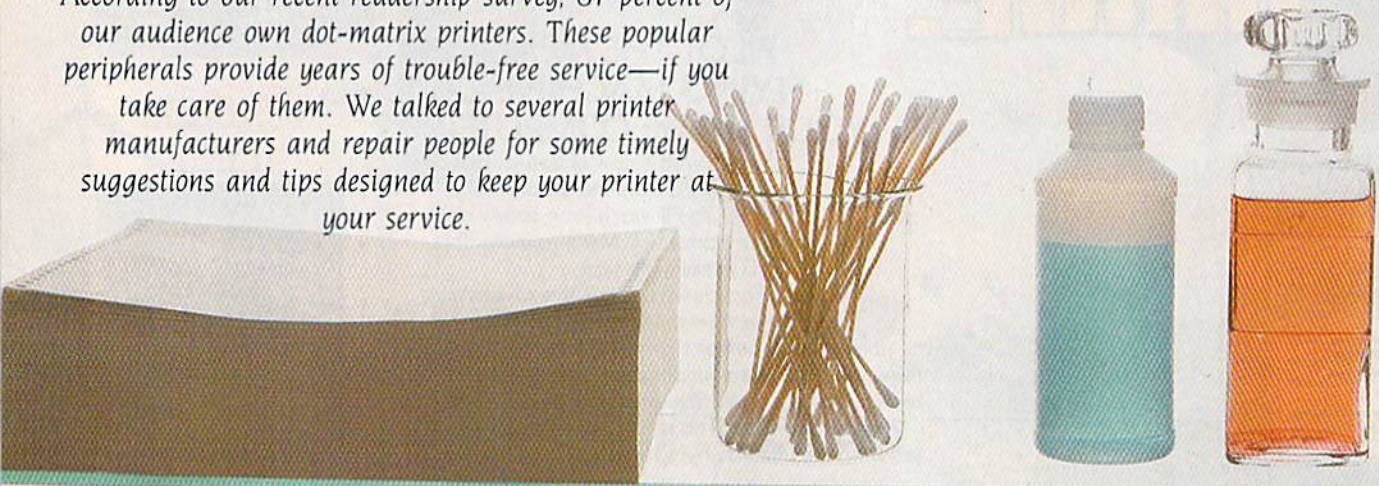
The Care and Feeding of Dot-Matrix Printers



Tom Netsel

According to our recent readership survey, 87 percent of our audience own dot-matrix printers. These popular peripherals provide years of trouble-free service—if you take care of them. We talked to several printer manufacturers and repair people for some timely suggestions and tips designed to keep your printer at your service.



Dot-matrix printers are popular because they are economical and reliable and can produce a wide range of printouts, ranging from complex graphics to near–letter-quality text. Despite their deserved reputation for value and reliability, printers do need occasional servicing and maintenance to keep your documents looking their best.

Before getting into specifics, let's define a few printer terms and take a brief look at how a dot-matrix printer works.

All dot-matrix printers use a *printhead* that consists of a vertical row of stacked wires. Printheads on most common printers contain either 9 or 24 print wires, or pins, although some models use 18 pins.

As the printhead moves across the page, these pins are hammered in different patterns onto an inked ribbon to form characters in a rectangular matrix. Each pin forms a tiny dot as it presses the ribbon to the paper.

Each pin inside the printhead is controlled by electronic circuitry inside the printer, which receives its information from the computer. When a pin gets a signal to fire, current passes through a solenoid in the printhead, turning the mechanism into an electromagnet. The magnet attracts an armature that is connected to a pin. The moving armature forces the pin against the ribbon, paper, and platen to form a dot. Once the charge is turned off, the pin springs back. The printhead then moves a fraction of an inch and the process repeats until the character, word, and line are printed.

Two common methods used to hold the paper in place are *friction feed* and *tractor feed*. When the friction method is used, the paper is held in place by a hard rubber roller called a *platen*. The platen serves not only to transport the paper through the printer but also to support the paper as the printhead pins strike it. Tractor-feed units commonly use rollers or belts to move the paper through the printer and an impact bar to support the paper as it is struck by the printhead pins.

Make It Comfortable

So much for the nuts and bolts of a printer. If you've just bought a printer, give a few thoughts about its installation. As with any electronic equipment, make sure your printer is in a convenient spot away from passing feet. Trip over a cable and break just one of its internal wires, and your printer will likely fail.

Don't place your printer next to a heater or heating vent or in direct sunlight. Extremes in temperature and humidity can have adverse effects on printers, warns Walter Paget, technical support manager for Okidata. "I have a rule of thumb," he says. "If it's comfortable for the operator, it's usually comfortable for the printer."

When connecting a printer, make certain it's properly grounded with a three-prong plug. "Don't use a cheater plug if you have only a two-prong receptacle," Paget says, "unless you ground the external connector." A strong electrical surge or nearby lightning strike could damage your printer if it isn't properly grounded.

Once your printer is installed and working, be sure to keep it clean, inside and out. Wipe off the outside occasionally with a damp rag to prevent dust buildup. About once a month, depending on its use, remove the paper dust that accumulates inside. You may have a vacuum cleaner with an adapter that's small enough to reach inside—but be careful. It could inadvertently suck up a loose screw or spring. Most experts recommend a can of compressed air that can be directed at dirty areas to dislodge dust and debris. Cans of compressed air can be purchased at electronics and office-supply stores.

Russ Kendal, Panasonic's service-training coordinator for computer products, has a further warning concerning vacuum cleaners. "The rubber or plastic nozzle on a vacuum cleaner has a tendency to build up a static charge as air moves through it. If you

12 Ways to Keep Your Printer Happy

- Keep food and other foreign objects away from your printer.
- Keep the outside and inside of your printer clean and free of dust.
- Don't lubricate the printer's bearings unless the manual recommends it. Many of today's printers are made with sealed bearings that never need lubricating.
- Apply a little light oil occasionally to the printhead guides. These are the rails on which the printhead rides. Sewing-machine oil is recommended, and a lubricant such as WD-40 is acceptable. Avoid direct spray; rather, apply a little onto a cotton swab and use that to lubricate the rails.
- If the platen becomes soiled with ink and smudges your paper, clean it with a little alcohol. Stay away from the printhead itself.
- Tractor pins out of alignment make your fanfold paper feed improperly. Instead of forcing them back into position, take note of Panasonic's Russ Kendal's advice: "Most of the time it's easier to give it to a service facility and let them force it. If they break it, they pay for it."
- Carefully and gently handle the clips that hold the paper in contact with the tractor feed. They're easy to break.
- Turn off the printer at night to avoid heat buildup and a potential fire hazard.
- Remove paper from the printer at night, or discard the first sheet when printing important documents. Paper left wrapped around the platen can develop a curl. It can jam if fed through a copier, and a curled sheet doesn't present a professional image on a business document. Curled paper can also feed back into the printer, causing it to jam.
- Dot-matrix printers are noisy. Ask anyone who has ever had to sit next to one. A soundproof box is a good investment, especially in an office.
- When using fanfold paper, make sure the paper has a straight path to the printer. It can tear and pull away from the pins if offset by only a couple of inches.
- Use the proper paper. Don't buy cardboard and expect it to feed through your printer. Select between 14- and 24-pound stock for best results (20-pound stock is recommended.) Don't try to force multicopy (NCR) forms through a printer's cut-sheet feeder.

Special thanks to Russ Kendal for help in compiling this list.

have a printer that contains delicate CMOS circuitry, the static charge on the nozzle could destroy some electronic chips if it comes in contact with a circuit board."

Failure to keep the inside of your printer clean can lead to several problems, according to Bryan Appel, president of Tektronics Plus, a computer repair facility in Batavia, Illinois. "If you run a lot of paper through a printer," he says, "you'll end up with a lot of dust. That mixes with the oil and gook in the printer, and you end up with quite a mess."

Dust can interfere with several sensors inside your printer. If it gets too thick, it can slow down and even bind the printhead, preventing it from moving at its proper speed. "Printers normally have circuitry that compensates for this," Appel says, "but if it gets too slow, you run into poor printing. Characters won't form properly, they may be slanted, and dots may be off-center. If it runs too slowly, it won't print at all, and all you'll get is a flashing error light."

Dust occurs naturally in printer paper, but liquids are another matter. These are usually introduced by careless users. "It sounds kind of silly, but make sure you don't spill coffee or dump stuff inside the machine," Paget says.

Kendal agrees. "I always tell people to keep coffee away from the machine. It doesn't drink as much as you do." About ten printers each year are returned to Panasonic that have had coffee or other beverages spilled inside, shorting circuits or gumming up the works.

Other foreign objects cause their share of problems when they find their way inside a printer. Paper clips and staples are particular hazards. Anything metallic can short out electronic circuits or bind mechanical parts. Appel once examined a defective printer and found a child's toy car jammed inside.

Malicious Mailing Labels

Even items normally associated with a printer are not without their own hazards. When asked about the most common problem afflicting printers, Appel was quick to reply. "What we see most is the infamous mailing label stuck in the platen."

When a printer finishes printing a label, it often advances a whole page. Many people hate to tear off the sheet and waste a few labels, so they try to roll them back through the printer. This may work, but many times a label peels off and sticks to the platen, pressure rollers, or metal pan surrounding the platen. A loose label can also jam the printhead and damage the pins.

Henry Lopez, president of AVT computer service center in Pompano Beach, Florida, agrees with Appel. He says labels rolled backward tend to unpeel and stick to the platen. That can result in a major disassembly job with some printers and costly labor charges for the customer.

At Panasonic, Russ Kendal sees his share of label problems, and he recommends what he calls continuous labels—labels that have no unbroken areas across the page where the backing paper shows. Look for labels whose separations are much smaller than normal. They tend to stay on the paper and peel off less easily.

Ribbons can also cause problems, especially when people look for a bargain. "I've had many instances where customers want to save a few bucks," Lopez says. "They buy generic ribbons, and they have problems with ribbons jamming or falling off the carriage. There are good generic ribbons, but they are hard to identify by looking at them. Stick to the name-brand ribbon companies." (See "A Word About Ribbons" for more information.)

Printhead Pointers

Even if you put your printer in a comfortable location, keep it clean, and use a good ribbon, problems can still develop. The printhead is usually the first item to show wear and tear. With an expected life of more than 100 million characters, there may come a time when letters appear scrambled or one of the pins fails to fire, leaving a blank dot in each character.

Most printheads can easily be removed or tilted away from the platen for inspection. Check your owner's manual for details. Examine the area around the pins for wear or damage. One of the pins themselves may actually be broken. If the printhead fails, it usually needs replacing, but that doesn't necessarily mean you have to ship your printer to a repair facility. Owners who have some mechanical ability often replace their own printheads, saving on labor charges.

AVT sells 9-pin printheads for most printers, with prices ranging between $49 and $90. Lopez says that the printheads on the Okidata series-100 printers are among the easiest to remove, and it's not a difficult procedure with many other printers. Although Lopez is in the repair business, he says he likes to help customers save money by encouraging them to change printheads themselves. If a local facility doesn't have the printhead you need, printer manufacturers often list stock numbers and information in their manuals for ordering parts by telephone or mail.

The price for a new 24-pin printhead is higher and may range up to $300, Lopez says. But many repair facilities can rebuild damaged heads for a fraction of this cost. "The warranty is the same as a new one," he says, "and this is often a better solution, economically, for high-end printers."

Power-supply circuits and the transistors that control the printhead are the electronic items most prone to failure. Printers usually have one main chip that handles most of the work, but it is vulnerable to strong electrical surges. This large chip often has 64–80 pins and can pose replacement problems. "It's not that expensive to replace," says Appel, at Tektronics Plus. "But a repair facility requires special equipment to unsolder a chip with that many pins or

it runs the risk of causing more board damage." It isn't a job for a friend who owns a soldering iron.

If you rely on your printer for business, Panasonic's Walter Paget suggests considering a service contract. "If the printer breaks, a lot of customers will go into a panic mode," he says.

Like an insurance policy, a service contract can make you feel better and add to your peace of mind in a crisis. It's no guarantee, but many repair facilities often give preferential treatment to contract holders because they know that person isn't a one-shot customer.

As with any electro-mechanical device, a printer doesn't have to fail completely before problems develop. It may produce print of substandard quality that a new ribbon won't improve.

In order to print properly, the printhead has to be perpendicular to the platen. If the head is out of alignment, characters may appear to be printing uphill. Also, the gap between the printhead and the platen needs proper alignment. If the gap is too wide, the pins may not be able to fire hard enough to impact the ribbon and paper. If it is too close, it may create smudges. Some printers or ribbon cartridges have a coarse gap adjustment that allows you to print paper of different thicknesses. If not, adjusting the printhead gap is usually something best left to a repair person.

It Won't Print

When Kendal gets a call at Panasonic from someone whose printer isn't printing, he first asks them to try a few things to help isolate the problem. These basic steps can prove helpful with any brand of printer and may save your printer an unnecessary trip to a repair center.

Most printers have a self-printing test that does not require the computer or any software. Put in a sheet of paper and see if your machine can print the alphabet and other characters. If this works, then the printer is working and the fault lies in the cable, interface, computer, or software.

Next, power up the system and test the cables and interface (if you are using one) with the computer. With a 64, try a simple PRINT command such as the following:

```
OPEN 4,4: PRINT#4,"THIS IS A TEST": PRINT#4: CLOSE4
```

If this procedure works, then the problem is narrowed down to the software or the program's printer driver. Make sure the printer and the printer driver are compatible. Not all programs work with all printers. Try a printout from a different piece of software that you know is compatible.

If both these tests fail but the self-test works, it could be the cable or interface connecting the printer and computer. Try to borrow a cable and interface that's known to be good and see if that makes a difference. "Suspect a faulty wire before you suspect your computer," Kendal says. If none of these tests work, then it's time to give the repair facility a call.

A Word About Ribbons

When you think of accessories for your computer system, a printer ribbon is probably nowhere near the top of your list. But did you know that the wrong ribbon can damage your printer?

If you're like most people, you probably used the ribbon that came with your printer until the print was too faint to read, and then you started looking for a replacement. Chances are you bought the first replacement you found on your dealer's shelf that fit your printer.

Each manufacturer uses a different formula when it comes to making ribbons. Excluding the external plastic cartridge, there are three major components in any ribbon. First, there's the ribbon material itself. Nylon is today's material of choice, but cotton was in use until a few years ago. Cotton ribbons had a tendency to break down and could clog the printer. "Most companies have stopped using this material, but if you come across a cotton ribbon, don't buy it," warns Walter Paget, technical support manager for Okidata.

The next two components of a ribbon are found in the inking. These consist of its carbon content—the element that makes the ink black—and a lubricant. The lubricant is necessary to prevent the printhead wires from jamming in the printer *jewel*, or printhead guide. Some vendors go heavy on carbon because they want the print to be very black. But by doing this, they put an abrasive material on the printhead and it wears the jewel, causing it to break down.

What happens when the jewel is damaged? "Assume we're printing the number 8," Paget explains."As the jewel breaks down, it can't hold the print wires in their proper position, and the outside of the 8 gets bigger and bigger. On another character, such as the letter *L*, the perpendicular portion becomes jagged because the wires are lined up incorrectly."

If the ribbon contains too much ink, it can also cause problems, according to Russ Kendal, service training coordinator for computer products at Panasonic. As the pins extend and make contact with the ribbon, the ink splatters and attaches itself to the pins. When the pins retract into the printhead, the ink congeals and you may have a pin that fails to fire because it's stuck by the dried ink. This problem can also occur when users re-ink their own ribbons and apply ink too heavily.

If dried ink causes a pin to stick, Kendal recommends taking a little alcohol on a clean rag and lightly wiping it across the pins. "The procedure isn't guaranteed," he says, "but it often cures that particular problem. Don't use a cotton swab, however. Fibers can pull loose and attach themselves to the ink and then you may have two jammed pins."

Most printer manufacturers make their own ribbons or recommend that certain ribbons be used in their machines. Watch out for bargain-basement, no-name ribbons. If you use a ribbon other than one recommended by the printer manufacturer and it damages your printer, it could void your warranty.

If you have any doubts about which ribbon to use, contact your local printer dealer, who will usually have a pretty good idea about which ribbons are best for your printer. If you still have doubts about a ribbon, firms such as Okidata test their printers with many different ribbon brands. A company will usually tell you if it has tested the brand in question and whether it caused any problems.

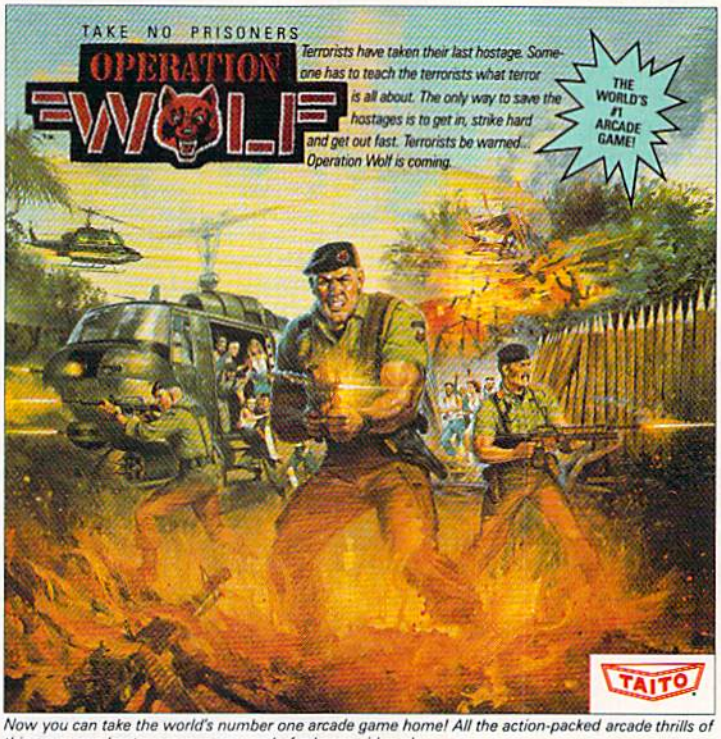
Just as there are PC clones, there are ribbon clones. The housing may resemble an original ribbon, but it may not have the original composition of fabric or ink. If you get a ribbon made of low-grade fabric, it won't hold as much ink as a better ribbon and your print quality will suffer. Also, the fabric often wears out faster.

"I always recommend using the manufacturer's suggested ribbon," Kendal says. "That doesn't have to be Panasonic. For an Epson printer, I recommend an Epson ribbon, rather than calling a store and asking for any old ribbon that'll fit."

A good ribbon has a life of between 3 million and 5 million characters. For the amount of printing a home user or small business does, it's foolish to skimp on a ribbon when the difference between top quality and poor quality is a few dollars. G

SEVEN WAYS TO MAKE YOUR COMMODORE SCREAM

1) EXPLOSIVE COMMANDO RAIDS.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Terrorists have taken their last hostage. Someone has to teach the terrorists what terror is all about. The only way to save the hostages is to get in, strike hard and get out fast. Terrorists be warned... Operation Wolf is coming.
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COMING SOON, THE CLASSIC MIND GAME, QIX.

3) BUBBLE BLOWING DINOSAURS.

BUBBLE BOBBLE
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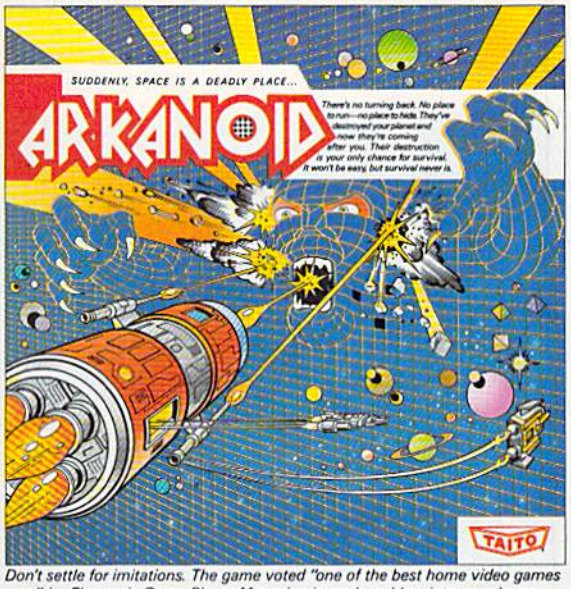
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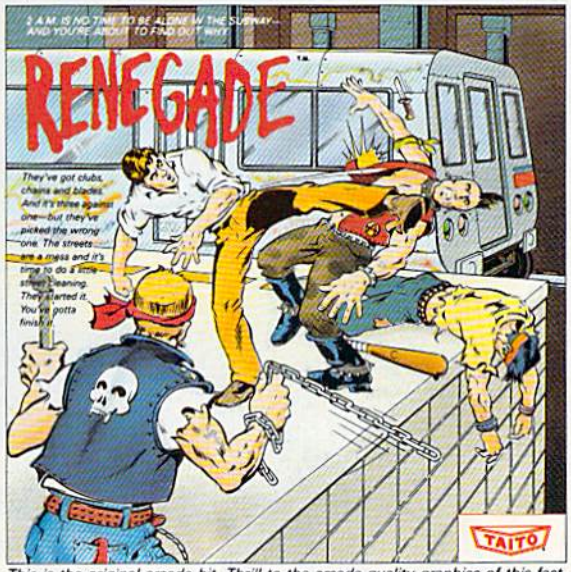

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WONDERWARE

Worlds of Fantasy on Disk

Neil Randall
Illustrations by Electric Brain

With magical kingdoms and mythical creatures, dark forces and heroes of great goodness, fantasy is a popular category of entertainment software. Here's a look at how it began, what it is now, and where it might be going.

Literary fantasy and computer fantasy games actually grow out of two separate traditions. The modern literary fantasy genre began with J. R. R. Tolkien's *The Lord of the Rings*, while modern fantasy gaming began with Gary Gygax and Dave Arnasan's Dungeons & Dragons role-playing game.

Any connection between the two is entirely coincidental, even though news stories on D & D always state that the game is based on Tolkien's works. (If anything, D & D comes from Robert E. Howard, creator of *Conan*, not Tolkien. Fantasy games on the computer continue that swords-and-sorcery tradition.)

There are many definitions of fantasy, but essentially, the fantasy game revolves around magic, quests, treasure, strange races of beings, and worlds with a fanciful medieval setting. Though D & D established this paradigm, it was subsequent fantasy games, such as *DragonQuest*, *RuneQuest*, and *Middle Earth*, that offered some variation on the original theme. When game designers began to work on the computer, they decided, not surprisingly, to follow the same path.

Because of this insistence on adhering to D & D clichés, there's no fantasy game on the market—for computers or otherwise—that could be considered good fantasy. True fantasy is based on mythology, and true magic is based on the unknown. Game designers have not yet figured out how to simulate either condition. While mythological creatures (even gods) appear in games, they're little more than normal creatures with superior characteristics. In fantasy games, magic systems are everywhere, but all they do is alter the numbers that make up the game. Clearly, designers have their work cut out for them if fantasy gaming is ever to be true to the fantasy genre.

Worlds of Words

Two categories have defined computer fantasy gaming: the text adventure and the role-playing game. (Fantasy has not had much to offer in the arcade area, probably because guns and lasers are more graphically convincing than swords, arrows, lances, and magic bolts.) Whereas science-fiction computer gaming got its start in the arcades with *Space Invaders*, *Asteroids*, and *Missile Command*, fantasy gaming got its start on the home computer with *Zork* and *Wizardry*. Of these, the first to appear on the 64 was the venerable *Zork*.

Zork is the offspring of *Adventure*, which you can still play on some telecommunications services. *Zork* established Infocom's reputation in the text-adventure business and was so successful that it spawned three sequels—*Zork II*, *Zork III*, and, recently, *Beyond Zork*. The subject of articles in *Newsweek* and the *New York Times*, the game has been imitated many times.

Zork is fun, addicting, and profoundly frustrating—but it's not fantasy. *Zork II* is closer to fantasy with its clever magic system, but *Zork III* returns to the semi–science-fiction basis of the original, and *Beyond Zork* strays not far at all. What the introduction of *Zork* did, however, was capitalize on the legion of role-playing fans who were coming over to computers from D & D and other paper games, allowing them to issue commands to the computer that were similar to those they could issue to a human game master.

Infocom was more successful, from a fantasy standpoint, with a second trilogy, consisting of *Enchanter*, *Sorcerer*, and *Spellbreaker*. Later came *Wishbringer*, with its largely undefined magic system. Of all the Infocom efforts, *Wishbringer* is its closest to a working fantasy.

Other companies have entered the text-adventure field, some with good results. The most successful was Synapse Software (later Brøderbund-Synapse), who, in its lamentably short-lived Electronic Novels series, came quite close to good fantasy. *Mindwheel* emphasizes living inside the minds of others and gives an approximation of an interesting fantasy world. Even better, though, is *Brimstone*, a strange game that manages to combine Dante, William Blake, and *Sir Gawain and the Green Knight*. *Brimstone* remains largely an unsung classic.

Words and Pictures

Despite Infocom's claim that a picture cannot begin to match a player's imagination, it wasn't a surprise when designers began to attempt fantasy adventures with an emphasis on graphics. This was during the years when the Apple II reigned supreme and the IBM PC was a text-only machine. The 64 was beginning to throw its graphic weight around with such programs as *M.U.L.E.*, *Flight Simulator II*, and *Star League Baseball*, and users were growing impatient with games containing either no

graphics or graphics simply transplanted from the Apple II.

Enter the text-and-graphics adventure. Early off the mark was Trillium—later Telarium—from Spinnaker Software. Trillium's early emphasis was on science fiction, but a line for young people, Windham Classics, recreated *The Wizard of Oz* and *Alice in Wonderland*. Both games were extremely well-handled, yet neither received its critical dues. Sierra On-Line's superb *Winnie the Pooh* was similarly overlooked. It remains the only text-and-graphics adventure playable by children in primary grades.

The Hobbit and *The Neverending Story* appeared shortly afterward; like the Windham and Sierra efforts, they are based on existing fantasy stories. Both use the format of text supported by graphics, although *The Neverending Story* uses the picture on the screen to give a substantial number of the clues needed to complete the game.

Firebird's (now Rainbird's) *The Pawn* has been among the most successful of the text-and-graphics adventures. The start of a text-and-graphics line that was soon to expand with *Guild of Thieves* and (recently) *Corruption*, *The Pawn* strives to offer players the same wit, charm, and absurdity of the original *Zork*—only here, the text is supplemented by pictures. Unfortunately for the game, the pictures don't do anything to help the player, although having an artist's conception of the scene does add to the player's feel for the world.

Perhaps the most bizarre of all the text-and-graphics adventures is Activision's *Tass Times in Tonetown*. In this game, too, the role of the graphics is largely to supplement the text, but Tonetown is such a weird place you won't want to play without them.

Mindscape has yet to release (for the 64 or 128, at least) *Shadowgate*, a fantasy using a system similar to its highly praised thriller, *Deja Vu*. When Mindscape does, text-and-graphics fantasy games for the 64 will come of age.

Role-Playing Adventures

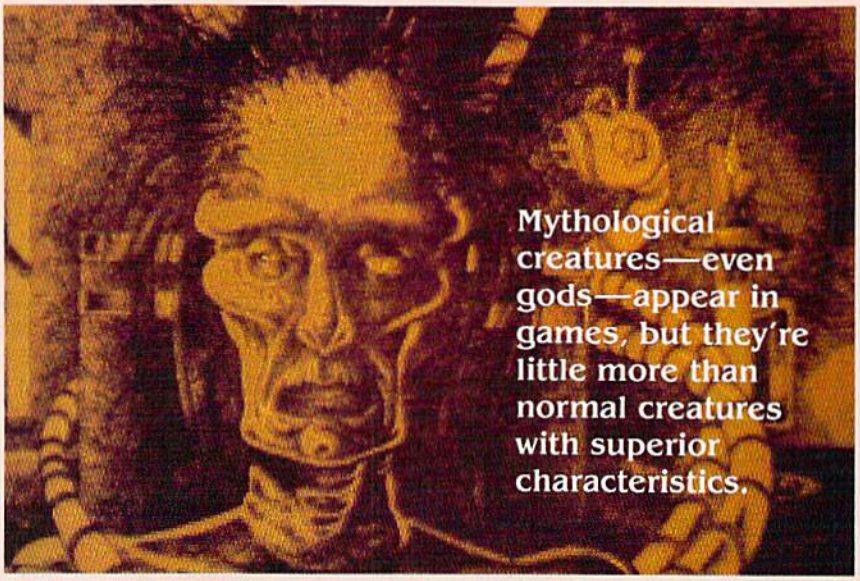
The role-playing adventure came to the 64 surprisingly late. For the first 18 months of the machine's existence, game players were eagerly awaiting the arrival of *Wizardry*, the extremely popular role-playing game that was available only for the Apple II. For some reason, Sir-Tech chose to wait a few more years to release the 64 version.

By the time *Wizardry* finally made its appearance, other role-playing systems had entrenched themselves on the 64. The most popular ones were released within a year of each other: *Phantasie*, *Ultima*, and *The Bard's Tale*. Game players became so enamored of these three systems that it became difficult and risky to establish a competing system. There have been several attempts—*Questron*, *Wizard's Crown*, *Deathlord*, and *Wizardry* itself—but the original big three remain the big three today.

Origin Systems' Ultima series has now reached its fifth installment, although only the first four have been released for the 64/128 market. The system's designer, Lord British (a.k.a. Richard Garriott), has established a unique, eclectic system with Ultima, establishing as well a reputation for impressive and intelligent revision to the basic system. Those beginning with *Ultima IV*, which is one of the few truly important attempts to include character development and morality in a game, will be immensely surprised if they step back and look at *Ultima I* or *II*. The game has matured dramatically.

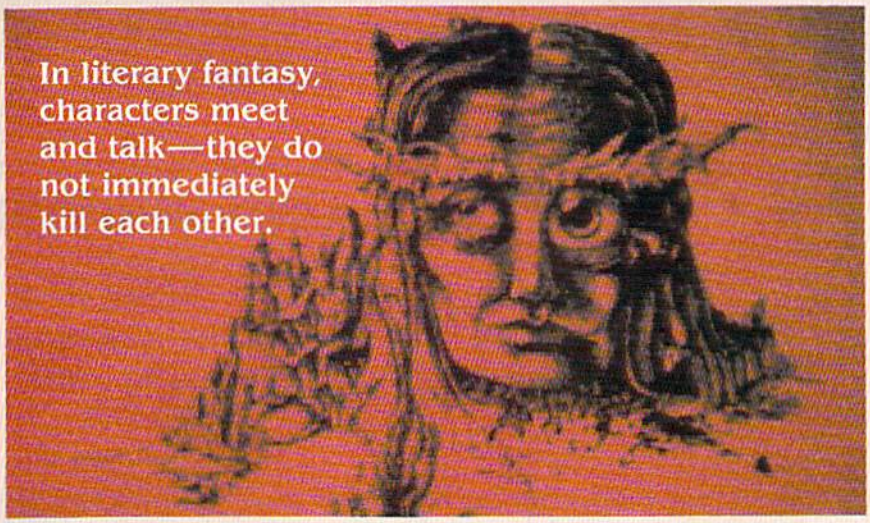
Until the release of *Phantasie*, SSI was known primarily for its war-game simulations and statistics-oriented sports games. *Phantasie* changed all that when it became by far the company's best seller. Using a somewhat quirky system, *Phantasie* is nevertheless fairly easy to play. The game's combat system was good from the beginning, but it evolved into a fully functional tactical model by the third installment. A few other nice touches, such as automatic dungeon mapping, make this series worth returning to.

When Electronic Arts' *The Bard's Tale* (designed by Interplay Productions) appeared, it contained some of the best graphics yet seen on the 64. To a large extent, that assessment hasn't changed. The series is up to a third installment now, with the release of last year's *Thief of Fate*, and the graphics are still something to behold. Beyond the graphics, the game has demonstrated the designer's commitment to producing as strong a system as possible. Bard's Tale adventures take a long time to play, and they don't answer the need for strong characterization. But in detail and execution, they're better than the original *Wizardry* from which the series is drawn.


Mythological creatures—even gods—appear in games, but they're little more than normal creatures with superior characteristics.

Wizards and Dungeons

The translation of *Wizardry* to the 64 was a disappointment. This is due partly to the age of the game and the fact that it still clearly shows its Apple II origins. Another



problem is the slow speed of the 1541 disk drive; this is also true of many other role-playing games on the 64. Even with speed-up cartridges, all of these games suffer from the sluggish drive; in the case of *Wizardry,* which remains a very strong fantasy system, it actually hinders play.

Still, play isn't hindered as much there as it is in MicroIllusions' *The Faery Tale Adventure* (reviewed in last month's issue). Ported over from the Amiga, where it was released to critical and commercial acclaim in 1986, *Faery Tale* differs from the systems described above in that you control only one adventurer, not a party. This eliminates the need for constantly checking the individual statistics, allowing you to concentrate on solving the quests. But the sharp focus and the superb graphics of the game are nearly destroyed by the time lost to the 1541, which seems to spin continually. If MicroIllusions revises *Faery Tale* with either speed-up cartridges or with the 1571 and 1581 in mind, *Faery Tale* will become a classic.

Similar in design to *Faery Tale* in both graphics and gameplay, Origin's *Times of Lore* addresses many of the limitations of the 64/1541 combination by reducing the complexity. Here, too, you control only one adventurer, and the graphics are extremely strong, but disk access is almost nonexistent. The tradeoff is a limitation in the variety of weapons, monsters, and retrievable objects, but the game is so playable, so nonfrustrating, that it draws you back again and again.

Since the success of Dungeons & Dragons was instrumental in starting the computer fantasy genre, it's surprising that D & D itself did not enter the computer-game sweepstakes until late in 1988. With its expertise in war-game simulation making it an appropriate choice, SSI released *Pool of Radiance,* a full-featured role-playing game based entirely on the Advanced Dungeons & Dragons game system.

A highly impressive adaptation of a complex game, *Pool of Radiance* has two unusual problems. First, its tactical combat system takes a long, long time to play. Second, with its eight sides of disks, it's simply too large to be played comfortably on the 64. Still, the series promises to be a strong one, and serious role players should take a hard look at it.

There are other role-player games: Datasoft's complex and *Wizardry*-like *Alternate Reality,* in two volumes (*The City* and *The Dungeon*); Epyx's impressive *The Legend of Blacksilver;* and Electronic Arts' *Deathlord,* which finally brings Japanese, rather than European, legend to fantasy computer games. All of these, however, must compete against some extremely popular models, so they may not survive on their individual strengths. Because role-playing games take so long to play, players tend to stick to one series rather than attempting several.

But Is It Fantasy?

Even with all of these highly competent, superbly executed games, fantasy gaming has some enormous problems. The first is the emphasis on the killing of monsters and the collection of treasure, attributable entirely to Dungeons & Dragons and the pre-computer role-playing environment. In the best literary fantasies, monster killing is practiced only when absolutely necessary.

Furthermore, in the greatest fantasy work of all, Tolkien's *The Lord of the Rings,* there's no monetary system. Putting aside the impossibility of even common animals in dungeons carrying around gold and gems (and they do in most of these games), there's no real reason to have money.

More serious is the moral dimension. In literary fantasy, characters meet and talk—they do not immediately kill each other. Character interaction in computer fantasy, however, remains minimal, and efforts in this area have not been strong or satisfying. Instead, players do little other than meet and kill monsters. This is not only bad fantasy; it's morally deplorable.

Finally, there's the problem of myth and magic. Bringing a god or demon into a game by merely creating a creature with an almost unlimited number of hit points is not the way to create a mythical tale. Also, characters in fantasy games almost never act as if they're part of a specified world with a specified culture and mythology; they simply wander around with no mind set other than our own. And as far as the magic goes, well, there's rarely anything to get excited about: Magic in fantasy games is merely specialized weaponry. There's no magic to it at all.

That's what's wrong with fantasy games on the 64 and on any other computer. It's also what's wrong with current literary fantasy, much of which is designed after the role-playing model—where you simply add in mythical and magical creatures without a mythical or magical context. Since fantasy-game players are also fantasy readers, the similarity between the books and games is probably not coincidental. But it's highly unfortunate and will take a courageous new group of writers and game designers to change it. Only then will fantasy on the computer come entirely into its own. **G**

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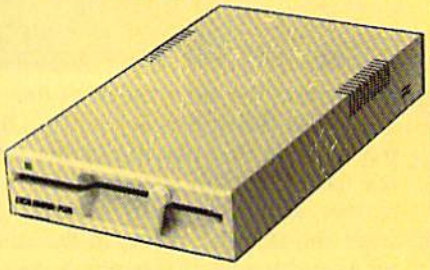

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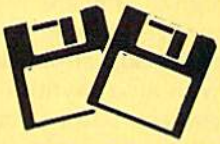

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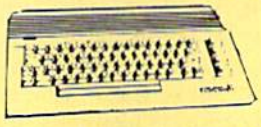

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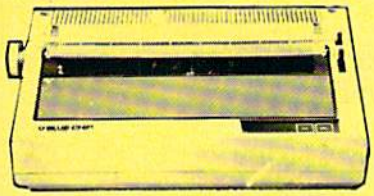

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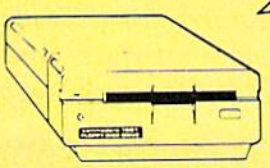

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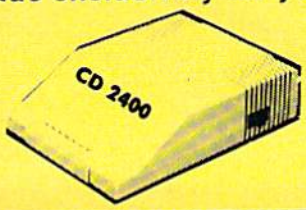

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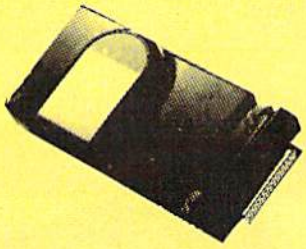

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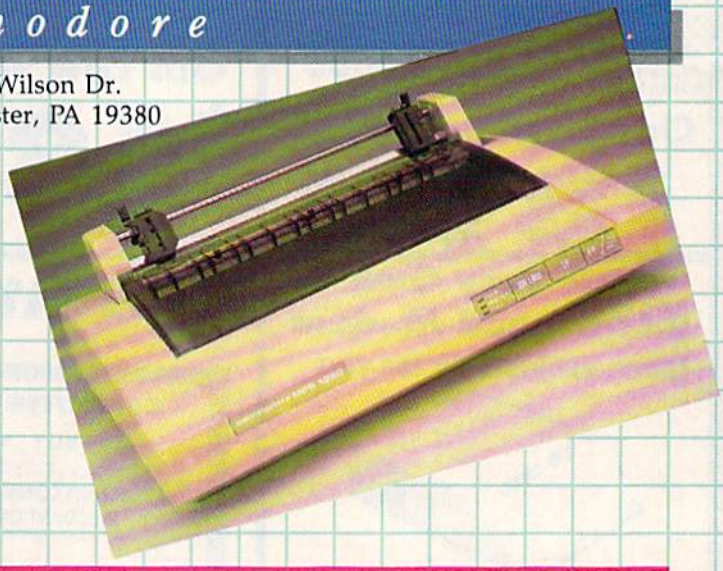

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Unlike our competitors, we at Utilities Unlimited, Inc. have been concentrating all our efforts in bringing the newest technology. The result of that effort is **SuperCard.** It is far **superior to all the copy utilities out there including:**

Ramboard/Renegade, Datel Burst Nibbler, 21Second, Ultrabyte, and any other backup utility on the market. So don't be led astray. **We will give you your money back** if they can back up more of the latest software, will they??? In a word "NO! ALL SALES ARE FINAL!!!" That is their response if you want to return RAMBO.

If you happen to see the ads on RAMBOard (original name huh), they claim to be cheaper. Well, that's partially true, but as is usual, mostly false. First you need to buy their board, then you need to spend another $34.95 for software to run their board. **That makes the cost of Rambo/Renegade to be at least $69.90. But then they claim you can use our software (what does that say about their software?). Well now, that may be just a bit of a white lie as well, while it's true that early, less reliable versions work with THEIR thing, the new more reliable versions of SuperCard software is specifically designed not to work with their RAMBO. For those people that have found out that the RAMBO and Renegade software package are quite inferior to SuperCard we offer the following suggestion. Send in your RAMBO and $24.95 and WE'LL SEND YOU THE REAL THING — SuperCard.** Needless to say you need a pair of hip boots to walk through their claim that they are the best. By the way, their software that backs up an unprotected disk in 50 seconds, well, it doesn't even use the RAMBO to work. **I suppose if you had a choice of an OLDSMOBILE or a Corvette with no engine, you would still pick the Oldsmobile.**

SuperCard 1541/1541c	**$49.95**	2 drive version	**$79.90**
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Utilities Unltd. has done it again!! We have consolidated and lowered the prices on the most popular parameters on the market . . . Super-Parameters, now you can get 1000 parameters and our 64/128 nibbler package for just **$39.95!!!** This is a complete 10 disk set, that includes every parameter we have produced.

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The company that has **The Most Parameters** is about to do something **Unbelievable.** We are giving you more of our secrets. Using this **Very Easy** program, it will not only **Read, Compare** and **Write Parameters for You;** it will also **Customize** the disk with your name. It will impress you as well as your friends. The **"Parameter Construction Set"** is like nothing you've ever seen. In fact you can even **Read Parameters** that you may have already written; then by using your construction set rewrite it with your new **Customized Menu. $24.95**

LOCK PICK - THE BOOKS - for the C64 and C128

Lock Pik 64/128 was put together by our crack team, as a tool for those who have a desire to see the **Internal Workings** of a parameter. The books give you **Step-By-Step Instructions** on breaking protection for backup of 100 popular program titles. Uses **Hesmon** and **Superedit.** Instructions are so clear and precise that anyone can use it.

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THE 128 SUPERCHIP - A, B or C (another first)

A — There is an empty socket inside your 128 just waiting for our **Super Chip** to give you 32K worth of great **Built-in Utilities,** all at just the **Touch of a Finger.** You get built-in features: **File Copier, Nibbler, Track & Sector Editor, Screen Dump,** and even a 300/1200 baud **Terminal Program** that's 1650, 1670 and Hayes compatible. Best of all, it doesn't use up any memory. To use, simply touch a function key, and it responds to your command.

B — HAS SUPER 81 UTILITIES, a complete utility package for the 1581. Copy whole disks from 1541 or 1571 format to 1581. Many options include 1581 disk editor, drive monitor, Ram writer and will also perform many CP/M & MS-DOS utility functions.

C — "C" IS FOR COMBO and that's what you get. A super combination of both chips A and B in one chip, switchable at a great savings to you. **All Chips Include 100 Parameters FREE!**
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That's right! Over 1000 graphics in a 10-disk set for only **$29.95.** There are graphics for virtually everything in this package. These graphics work with Print Shop and Print Master.

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Introducing the **World's First Color Screen Dump** in a cartridge. Explode! V4.1 will now **Support Directly** from the screen. FULL COLOR PRINTING for the **Rainbow Star NX-100** and also the **Okidata 10 & 20** printers.

The **Most Powerful Disk Drive** and **Printer Cartridge** produced for the COMMODORE USER. **Super Friendly** with the features most asked for.

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- **SUPER PRINTER FEATURES** allows ANY DOT MATRIX PRINTER even 1526/802 to print HI-RES SCREENS (using 16 shade GRAY SCALE). **Any Printer or Interface Combination** can be used with SUPER EXPLODE! V4.1 or V3.0.
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ALL THE ABOVE FEATURES, AND MUCH MORE!
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MAKE YOUR C-64, 64-C or C-128*, D-128* SUPER FAST and EASY to use.

SUPER TRACKER

Utilities Unlimited has done it again. At last an easy way to find out where the protection really is. **Super Tracker** will display the location of your drive head while you are loading a piece of software. This information will be very useful, to find where the protection is. **Super Tracker** has other useful options such as: track and half-track display, 8 and 9 switch, density display, write protect on/off. This incredible little tool is encased in a handsome box that sits on top of your drive. Works with all C/64/128 and most C/64 compatible drives. Some minor soldering will be required.

Introductory Priced at Just **$69.95**

A Guide to Commodore User Groups

Part 1

Mickey McLean

This annual *Gazette* feature provides an up-to-date list of user groups across the U.S., throughout Canada, and around the world. Part 1 includes states *A* through *M* (Alabama–Montana). Under each state heading, groups are listed in order according to zip code.

User groups from the remaining states (Nebraska–Wyoming), from APO sources, and from foreign countries will be listed in part 2, in next month's issue.

If your group does not appear in this list and you wish to be included, send your club name, address, and bulletin board service telephone number (if available) to

Commodore 64/128 User Group Update
COMPUTE!'s Gazette
P.O. Box 5406
Greensboro, NC 27403

Your group will then be listed in "User Group Update" in an upcoming issue.

Note: When writing to a user group for information, please remember to include with your request a stamped, self-addressed envelope.

ALABAMA

Valley Commodore Users Group (VCUG), P.O. Box 835, Decatur, AL 35602-0835

Scottsboro Commodore Users Group, Rt. 5, Box 255, Scottsboro, AL 35768

Coosa Valley Commodore Club (CVCC), P.O. Box 1893, Gadsden, AL 35902-1893

Amiga/Commodore Club of Mobile, 3868-H Rue Maison, Mobile, AL 36608

Commodore Mobile Users Group (CMUG), P.O. Box 9524, Mobile, AL 36691-0524

ALASKA

Sitka Commodore User's Group, P.O. Box 2204, Sitka, AK 99835

ARIZONA

Commodore User Group of Arizona, P.O. Box 21291, Phoenix, AZ 85036

Arizona Commodore Users Group, P.O. Box 27201, Tempe, AZ 85282

Gila Hackers, Route 1, Box 34, Globe, AZ 85501

Catalina Commodore Computer Club Inc., P.O. Box 32548, Tucson, AZ 85751 (BBS# 602-790-6751)

ARKANSAS

The Southwest Arkansas Commodore Users Group, 404 S. Greening St., Hope, AR 71801

Commodore User Group, Rt. 9, Box 354-A, Hot Springs, AR 71913

River City Commodore Club, 1 Devon Ln., Jacksonville, AR 72076 (BBS# 501-982-0504)

Commodore Information Association (CIA), Rt. 1, Box 103 F, Mayflower, AR 72106 (BBS# 501-470-0624)

The Commodore Council, 1821 Breckenridge Dr., Little Rock, AR 72207

Triple-D 64, P.O. Box 301, Reyno, AR 72462

The Personal Touch * Computer Group of Walnut Ridge, 503 Kaylynn Dr., Walnut Ridge, AR 72476

CALIFORNIA

Begabytes C64, 9802 S. Calmada Ave., Whittier, CA 90605

Southern California Commodore Users Group, 11018 E. Rosecrans Ave., Suite 203, Norwalk, CA 90650 (BBS# 213-864-2105)

Commodore Helpers of Long Beach, 3736 Myrtle Ave., Long Beach, CA 90807

San Fernando Valley Commodore Users Group, 7017 Geyser Ave., Reseda, CA 91335

California Area Commodore Terminal User Society (CACTUS), P.O. Box 1277, Alta Loma, CA 91701

Association for Sharing Commodore Information (ASCI), 8395 Ninth St., Rancho Cucamonga, CA 91730

South Bay Commodore Users Group, P.O. Box 1899, Chula Vista, CA 92012-1899

East County Commodore Users Group, P.O. Box 21399, El Cajon, CA 92021 (BBS# 619-258-9078)

Oceana-64 Commodore User Group, 1004 Plover Way, Oceanside, CA 92056 (BBS# 619-433-3599)

San Diego Commodore Users Group, P.O. Box 86531, San Diego, CA 92138

General Dynamics CRA Commodore Computer Club, General Dynamics Electronics, MZ-7234A, P.O. Box 85310, San Diego, CA 92138-5310

Club-64 (San Bernardino), P.O. Box 514, Patton, CA 92369 (BBS# 714-886-2069)

Victor Valley Commodore Interest Association (VVCIA), P.O. Box 385, Victorville, CA 92393-0241 (BBS# 619-243-4942)

Commodore Users Group of Riverside (CUGR), P.O. Box 8085, Riverside, CA 92515

Commodore Technical User Group (CTUG), P.O. Box 1497, Costa Mesa, CA 92628

Power Surge, c/o Orangewood Academy, 13732 Clinton Ave., Garden Grove, CA 92643

Coastline Commodore Club, 20311 Ravenwood Ln., Huntington Beach, CA 92646

South Orange Commodore Klub (SOCK), 25401 Champlain Rd., Laguna Hills, CA 92653

Ventura Commodore Club, 1306 Finch Ave., Ventura, CA 93003

CIVIC64, P.O. Box 2442, Oxnard, CA 93034-2442 (BBS# 805-647-8300)

A Bakersfield Area Commodore Users Society (ABACUS), P.O. Box 40334, Bakersfield, CA 93306 (BBS# 805-832-7186)

Simply Users of Computers Combining Experience for Strength and Success, 184 Santa Ynez Ave., Paso Robles, CA 93446 (BBS# 805-238-7359)

Central Coast Commodore Users Group, 4237 Plumeria Ct., Santa Maria, CA 93455 (BBS# 805-934-2216)

Fresno Commodore User Group/64UM, P.O. Box 16098, Fresno, CA 93755 (BBS# 209-456-2533)

PLUG (Plus/4 Users' Group), Box 1001, Monterey, CA 93942

Ft. Ord Commodore Users (FOCUS), P.O. Box 2180, Seaside, CA 93955-2180 (BBS# 408-384-4209)

CWEST Bay Area Commodore Users, P.O. Box 146731, San Francisco, CA 94114-6731

PET-on-the-Air, 525 Crestlake Dr., San Francisco, CA 94132

Diablo Valley Commodore User Group, P.O. Box 27155, Concord, CA 94527

Commodore Hayward Users Group (CHUG), P.O. Box 2072, San Leandro, CA 94577

North Bay User's Group (NBUG), P.O. Box 7156, Vallejo, CA 94590

Marin Commodore Computer Club, 140 E. Kelley Dr., Novato, CA 94949 (BBS# 415-883-2558)

64/More Commodore User Group, Inc., P.O. Box 26811, San Jose, CA 95159-6811 (BBS# 408-258-5463)

Mother Lode Commodore User's Group, P.O. Box 1286, San Andreas, CA 95249

Lake Country Computer Users, Commodore SIG, P.O. Box 385, Clearlake, CA 95422
Amateurs and Artesians Computing, P.O. Box 682, c/o Alex KR6G, Cobb Mountain, CA 95426
Sacramento Commodore Computer Club, P.O. Box 13393, Sacramento, CA 95813-3393 (BBS# 916-991-7319)
Hub Area Commodore Club (HACC), 10734 Mooney Flat Rd., Smartsville, CA 95977
Commodore Owners Users Group of Redding (COUGOR), 37 Rose Ln., Redding, CA 96003
Elf Brigade Swipe Swap, P.O. Box 173, Red Bluff, CA 96080

COLORADO

Colorado Commodore Computer Club, 1104 S. Oakland St., Aurora, CO 80012 (BBS# 303-751-3448)
Ft. Collins C3, P.O. Box 2051, Ft. Collins, CO 80522
Front Range Commodore Club, P.O. Box 272, Niwot, CO 80544-0272
The Commodore Club, P.O. Box 25851, Colorado Springs, CO 80936 (BBS# 719-392-0038)
Western Slope Commodore User's Group, P.O. Box 4142, Grand Junction, CO 81502

CONNECTICUT

Capital Region Commodore Computer Club (CRCCC), P.O. Box 2372, Vernon, CT 06066
Eastern Connecticut Commodore Users Group, P.O. Box 136, Hebron, CT 06248 (BBS# 203-228-1031)
The New London County Commodore User's Group (NLCCUG), P.O. Box 697, Groton, CT 06340 (BBS# 203-848-1986 or 203-848-4044)
Computer Users Group, 6 Saner Rd., Marlborough, CT 06447
Fairfield County Commodore User Group (FCCUG), P.O. Box 212, Danbury, CT 06813
Stamford Area Commodore Society (SACS), P.O. Box 2122, Stamford, CT 06906-0122 (BBS# 203-847-6235)

DELAWARE

First State Commodore Club, P.O. Box 1313, Dover, DE 19903
The Commodore U.S.A. Club, Rt. 2, Box 329, Delmar, DE 19940

FLORIDA

Port Orange Commodore User Group (POCUG), 1244 Thomasina Dr., Port Orange, FL 32019 (BBS# 904-756-2700)
Public Domain Users Group, P.O. Box 1442, Orange Park, FL 32067
Welaka Commodore Users Group, P.O. Box 1104, Welaka, FL 32093-1104
Commodore Computer Club of Jacksonville, 9735 Orr Ct. N, Jacksonville, FL 32216
Commodore User Group of Pensacola, P.O. Box 36367, Pensacola, FL 32516 (BBS# 904-456-8205)
Gainesville Commodore User Group, P.O. Box 14716, Gainesville, FL 32604-4716
Lake/Sumter Commodore Users Group, P.O. Box 416, Leesburg, FL 32749
Titusville Commodore Club, 890 Alford St., Titusville, FL 32796 (BBS# 407-269-2169)
El Shift OH, P.O. Box 361348, Melbourne, FL 32936-1348
Fellsmere's Club Compu-Mania Inc., P.O. Box 629, Fellsmere, FL 32948-0629
Miami Individuals with Commodore Equipment (MICE), 11110 Bird Rd., Miami, FL 33165 (BBS# 305-253-1494)
Gold Coast Commodore Group, P.O. Box 375, Deerfield Beach, FL 33443
Charlotte County Commodore Club (CCCC), P.O. Box 512103, Punta Gorda, FL 33951-2103
Bits and Bytes Computer Club, 1859 Neptune Dr., Englewood, FL 34223
Mana Sota Commodore Users Group (MSCUG), P.O. Box 698, Oneco, FL 34264-0698
Ram-Rom 84 Commodore Users Group, P.O. Box 3880, Venice, FL 34293-3880
Commodore Brooksville User Group (C-BUG), P.O. Box 1261, Brooksville, FL 34605
Clearwater Commodore Club Inc., P.O. Box 11211, Clearwater, FL 34616
Gulfcoast 64's Commodore Users Group, P.O. Box 11180, Clearwater, FL 34616
Suncoast Commodore Club, P.O. Box 6628, Ozona, FL 34660-6628
Suncoast Bytes Commodore Computer Club, P.O. Box 721, Elfers, FL 34680

GEORGIA

Stone Mountain Users Group (SMUG 64/128), P.O. Box 1762, Lilburn, GA 30226 (BBS# 404-925-8829)
Commodore Format User's Group, P.O. Box 91541, East Point, GA 30364
Athens Commodore Users Group, One Beech Haven, Athens, GA 30606
C-64 Friendly Users Group, 775 Kings Rd., Athens, GA 30606
Commodore Club of Augusta, P.O. Box 14337, Augusta, GA 30919 (BBS# 803-279-7203)
Savannah Commodore User Group, P.O. Box 1171, Savannah, GA 31402-1171 (BBS# 912-897-3614)

HAWAII

No listings

IDAHO

Pocatello Commodore Users Group (PCUG), Rt. 2, Box 48E, Pocatello, ID 83202
PFP 64 Software Exchange, 742 E. 19th, Jerome, ID 83338
Banana Belt Commodore Users Group (BBCUG), P.O. Box 1272, Lewiston, ID 83501
GEM-64, Ken Rosecrans, 407 N. DeClark, Emmett, ID 83617
Commodore Treasure Valley/Boise Users Group (TV/BUG), P.O. Box 6853, Boise, ID 83707

ILLINOIS

Great Lakes Commodore Club, P.O. Box 322, Lake Bluff, IL 60044
Fox Valley PET (Commodore) Users Group, 833 Prospect Ave., Elgin, IL 60120 (BBS# 312-888-1112)
Computers West, P.O. Box 3357, Glen Ellyn, IL 60138-3357 (BBS# 312-983-6054)
Board Users Syndicate, P.O. Box 1112, South Holland, IL 60473 (BBS# 312-385-0341 or 312-891-9212)
Southwest Regional Association of Programmers/64 Users Group (SWRAP), P.O. Box 342, Bedford Park, IL 60499-0342
Chicago B-128 Users Group (CBUG Inc.), 4102 N. Odell, Norridge, IL 60634
CCR Commodore Club, P.O. Box 10022, Rockford, IL 61131 (BBS# 815-229-0132)
Knox Commodore Club, P.O. Box 494, Galesburg, IL 61402-0494 (BBS# 309-343-1556)
Survivors of the Sixty-Four Users Group (SOSUG), P.O. Box 6108, Macomb, IL 61455
Canton Area Commodore Users Group, Box 61, Canton, IL 61520
Commodore 64/128 Computer Pen Pal Club!, P.O. Box 192, Georgetown, IL 61846
Meeting 64/128 Users Thru the Mail, R.R. 1, Box 151, St. Joseph, IL 61873
Champaign-Urbana Commodore User Group (CUCUG), 802 N. Parke St., Tuscola, IL 61935 (BBS# 217-356-8056)
Gateway Computer Club, P.O. Box 1839, Fairview Heights, IL 62208
Western Illinois PET User Group (WIPUG), Rt. 5, Box 75, Quincy, IL 62301
Capitol City Commodore Computer Club (5 Cs), P.O. Box 2961, Springfield, IL 62708
SPUG Computer Club, P.O. Box 9035, Springfield, IL 62791

INDIANA

Indianapolis Computer Club, Inc., P.O. Box 11367, Indianapolis, IN 46201
Kosciusko Commodore User's Group, 312 E. Prairie, Warsaw, IN 46580
Logansport Commodore Club, P.O. Box 1161, Logansport, IN 46947
Rochester Commodore Computer Club, 428 Clay St., Rochester, IN 46975 (BBS# 219-223-8107)
Commodore Small Town Users Group (CSTUG), P.O. Box 161, Vevay, IN 47043
QS! Alliance, P.O. Box 1403, New Albany, IN 47150
Richmond Area Computer Users Group (RACUG), P.O. Box 1332, Richmond, IN 47375 (BBS# 317-935-1256)
Bloomington Commodore Users Group (BCUG), 403 E. Audubon Dr., Bloomington, IN 47401
Fraternal Order of Police Computer Club (FOPCC), 2535 Anthony Dr., Evansville, IN 47711
Commodore Owners of Lafayette (COOL), P.O. Box 5763, Lafayette, IN 47903
Alliance of Commodore Enthusiasts (ACE), 1315 Catula Ave., Lafayette, IN 47905

IOWA

Commodore Users Group Ames Region (COUGAR), P.O. Box 2302, Ames, IA 50010-2302
Capitol Complex Commodore Computer Club, P.O. Box 212, Des Moines, IA 50301
Ft. Dodge Commodore Users Group, P.O. Box 63, Moorland, IA 50566
3C Users Group, R.R. 3, Box 20, Charles City, IA 50616
Product Engineering Center Commodore Users Group (PECCUG), 333 Joy Dr., Waterloo, IA 50701
Crawford County Commodore Users Group, 519 N. 19th St., Denison, IA 51442
Washington Area Commodore Users Group, P.O. Box 445, Washington, IA 52353
Quad Cities Commodore Computer Club, P.O. Box 3994, Davenport, IA 52808 (BBS# 309-762-7962)

KANSAS

TCCUG, Inc., P.O. Box 8439, Topeka, KS 66608 (BBS# 913-862-1604)
Newton Area Commodore Club, 112 Brookside, Newton, KS 67114 (BBS# 316-283-9141)
Salt City Commodore Club, P.O. Box 2644, Hutchinson, KS 67504 (BBS# 316-665-7222)
High Plains Commodore Users Group, 1307 Western Plains, Hays, KS 67601 (BBS# 913-628-6611 after 9:00 p.m. CST)

KENTUCKY

Louisville Users of Commodore of Kentucky (LUCKY), P.O. Box 19032, Louisville, KY 40219-0032 (BBS# 502-969-9360)
Purchase C64 User's Group, Rt. 1, Box 209A, Calvert City, KY 42029
Glasgow Commodore User's Group, Inc., P.O. Box 154, Glasgow, KY 42141 (BBS# 502-678-5292)
Muhlenberg County Commodore Users Group (MCCUG), P.O. Box 12, Greenville, KY 42345

LOUISIANA

New Orleans Commodore Klub, 3701 Division St., Suite 140, Metairie, LA 70002
Sixty Four'Um Commodore User's Group, P.O. Box 6481, Metairie, LA 70009-6481
Southeast Louisiana Commodore Users' Group, P.O. Box 1138, Gray, LA 70359
Commodore Users Group of Slidell (CUGS), P.O. Box 3164, Slidell, LA 70458
Baton Rouge Area Commodore Enthusiasts (BRACE), P.O. Box 1422, Baton Rouge, LA 70821 (BBS# 504-774-7754)

MAINE

Commodore Users Group of Coastal Maine, R.R. 2, Box 3254, Bowdoinham, ME 04008
Your Users Group (YUG), P.O. Box 1924, N. Windham, ME 04062
Southern Maine Commodore, P.O. Box 416, Scarborough, ME 04074-0416
Commodore Users Society of Penobscot (CUSP), c/o 101 Crosby Hall, University of Maine at Orono, Orono, ME 04469
Southern Aroostook Commodore User's Group, P.O. Box 451, Houlton, ME 04730
Northern Maine Commodore User's Group, P.O. Box 493, Loring AFB, ME 04751

MARYLAND

FOCUS DC/MD/VA, P.O. Box 153, Annapolis Junction, MD 20701 *(Note: This is a federation consisting of 20 user groups in the VA/MD/DC area, not a club offering individual memberships.)*

Laurel-Bowie User Group (L-BUG), 3707 Irongate Ln., Bowie, MD 20715

Rockville Commodore Users Group, P.O. Box 8805, Rockville, MD 20856

National Bureau of Standards Commodore Users Group, 8 Cross Ridge Ct., Germantown, MD 20874

Gaithersburg Commodore Users Group, P.O. Box 2033, Gaithersburg, MD 20879

Capital COMAL User Group, 10200 Leslie St., Silver Spring, MD 20902

Montgomery County Commodore Computer Society, P.O. Box 2689, Silver Spring, MD 20902

VIC Appreciators (VICAP), 10260 New Hampshire Ave., Silver Spring, MD 20903

Harford Commodore Users Group (HCUG), P.O. Box 209, Fallston, MD 21047 (BBS# 301-877-3230)

BAYCUG, 110 Danbury Rd., Reisterstown, MD 21136

BAUD, 243 W. 31st St., Baltimore, MD 21211

Westinghouse Commodore Users Group, P.O. Box 8756, Baltimore, MD 21240

Frederick Functioneers, P.O. Box 1913, Frederick, MD 21701-1010

Hagerstown User Group (HUG), 23 Coventry Ln., Hagerstown, MD 21740

MASSACHUSETTS

Pioneer Valley Commodore Club, 6 Laurel Terr., Westfield, MA 01085 (BBS# 413-568-4466)

North Worcester County Commodore User's Group, 208 Clark St., Gardner, MA 01440

Commodore Users Group of Cape Cod, P.O. Box 1490, Cotuit, MA 02635 (BBS# 508-888-8769)

Fall River Commodore's Club, 117 Lewin St., Fall River, MA 02720

MICHIGAN

Michigan Commodore Users Group, Inc., P.O. Box 539, East Detroit, MI 48021 (BBS# 313-293-7340)

Computer Operators of Marysville, Port Huron, 2937 E. Woodland Dr., Port Huron, MI 48060 (BBS# 313-364-6489)

Washtenaw Commodore Users Group, P.O. Box 2050, Ann Arbor, MI 48106-2050 (BBS# 313-971-2714)

Soft-Type Users Group, 20231 Westmoreland, Detroit, MI 48219

Saginaw Area Commodore User's Group (SACUG), P.O. Box 2393, Saginaw, MI 48605

Commodore Computer Club, 4702 Jefferson, Midland, MI 48640 (BBS# 517-496-2093)

Bay Area Commodore Club, 338 S. Sheridan Ct., Bay City, MI 48708

Kalamazoo Valley Home Users Group, P.O. Box 3085, Kalamazoo, MI 49003 (BBS# 616-345-6362)

Battle Creek Commodore and Amiga V. Enthusiasts (BCCAVE), 1299 S. 24th, Battle Creek, MI 49015

Columbia Commodore Computer Club (C⁴), 133 Ernest, Brooklyn, MI 49230

West Michigan Commodore Users Group, P.O. Box 88191, Kentwood, MI 49508

Traverse Area Commodore Club, 404 Bates St., Fife Lake, MI 49633

MINNESOTA

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VERBATIM

Challenge a friend in this novel word game—or use it to increase your child's vocabulary and spelling skills. For the 64.

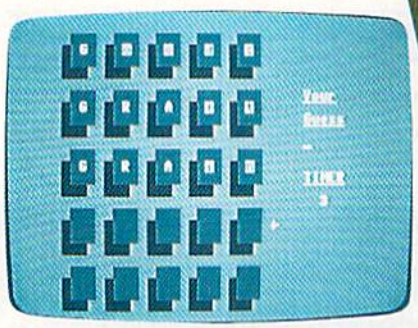
Mark Tuttle

There's nothing new about word-guessing games; they've been around for quite a while. This one, however, contains several twists that make it both a good learning tool for children and fun for players of all ages.

The object of "Verbatim" is simple: You must deduce, in five tries or less, a word entered by a second player or selected by the 64. Words vary in length from three to six letters.

Getting Started

Verbatim is written entirely in BASIC. To avoid typing errors while entering the program, use "The Automatic Proofreader," found elsewhere in this issue. Be sure to save a copy of the program to tape or disk when you've finished typing it in. To start the game, load it and type RUN.



"Verbatim" can be both a game and an educational tool.

When the game begins, you're given the first letter of a word. Type in your guess before the timer reaches 0. If your response is incorrect, the computer provides you with clues before the next round. Any letter you've entered that's in the word and positioned correctly is shown in uppercase. Any letter that's in the word but in the wrong position is shown in lowercase. All other letters appear in reverse lowercase.

If, after five tries, you haven't guessed the word correctly, the game's over.

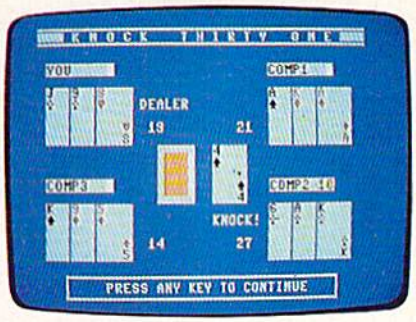
Customize It

Verbatim includes 120 words but will accept as many as 400. The word list is grouped by length in DATA statements beginning at line 1000. Add or delete words as you wish. If you modify the list, be sure to retain the data value, −1, that marks the end of each word group.

See program listing on page 75.

KNOCK 31

Robert B. Cook



Computer player 2 wins this round with cards that total 27 points.

Experience the thrill of Las Vegas without risking your life's savings. Put on your thinking cap, turn on your 64, and get ready to face three expert computer opponents. Joystick optional.

People have been playing card games for hundreds of years. Fortunes have been made with the turn of a friendly card. But the beautiful buildings surrounding Las Vegas are a reminder that even more fortunes have been lost. If you'd like to do some big-time Las Vegas gambling without touching your pocketbook, "Knock 31" is the card game for you.

Knock 31 is a game of skill and strategy. It's similar to blackjack in that the object is to get a higher point total than your opponents do. But Knock 31 is more challenging—only cards of the same suit count toward your total.

Getting Started

Knock 31 is written entirely in BASIC. Using "The Automatic Proofreader," found elsewhere in this issue, carefully type in the program and save a copy to disk or tape before running it.

Each player begins the game with the same number of points. Set the starting-point total, from 5 to 25 points, by pressing the joystick forward or back or by using the £ and = keys. Select a lower point total for a quicker game.

After you've set the point total, the computer starts dealing cards. The first player to be dealt an ace is the dealer for the opening round. To start the round, each player is dealt three cards. Your cards are dealt face up, while your opponents' cards are dealt face down—but don't worry; the other players can't see your hand. The deck is placed on the table, and one card is turned over to form a discard pile.

Playing the Game

Play progresses clockwise from the dealer. Each player in turn has the option of drawing a card either from the deck or from the discard pile. One card must then be discarded.

You select cards by moving the onscreen pointer to a card and pressing RETURN or the fire button of a joystick plugged into port 2. If you use a joystick, push it left, right, forward, or back to move the pointer. If you use the keyboard, press the *, ↑, £, and = keys to move the pointer.

If you think you have a good hand, you may elect to knock. When a player knocks, the other players have one more round to try to improve their hand. To knock, press Y at the DO YOU WANT TO KNOCK? [Y/N] prompt or move the joystick forward (moving it in any other direction will cause play to continue as if no one has knocked).

And the Winner Is . . .

When play is over, the points are totaled. Twos are worth 2 points, 3s are worth 3 points, and so on. Tens, jacks, queens, and kings are worth 10 points each. Aces are the highest card—they're worth 11 points.

Only cards of the same suit count toward the total. For example, a hand consisting of the 3 of hearts, the 7 of clubs, and the king of spades is worth 10 points. A hand consisting of the 3 of spades, the 7 of clubs, and the king of spades is worth 13 points (both the 3 and the king are spades).

If the knocking player has the best hand, he or she wins and all other players lose 1 point from their game points. A *double round* occurs when someone knocks and wins in the first round or when one player's total is 31. In this case, all other players lose 2 points from their game points. If a nonknocking player has the highest total, the knocking player loses 2 game points. If the knocker's total and another player's total tie for the top score, the knocking player loses 2 game points.

Players are eliminated when their game point total is 0 or less. If you've been eliminated, you're given the option of watching the remaining players play.

Strategy

Rounds with all four players are the hardest and call for special strategies and tactics. If you have a weak hand, it's a good idea to pick up high cards from the discard pile. This way you have a solid foundation to build on.

Pay close attention to the cards your opponents pick up. If you know what your opponents need, you can avoid throwing critical cards. But if you know you have no chance of winning a round, you may try throwing a good card. If another player picks up this card and wins the round, it not only saves you a game point, but it could also cost the knocker two game points.

The fewer opponents you have, the more gambles you can take. Knocking in the first round against three opponents with a total of 17 or less is very risky, but the chances are good that you'll beat a single opponent.

See program listing on page 76. **G**

HI-RES WINDOWS

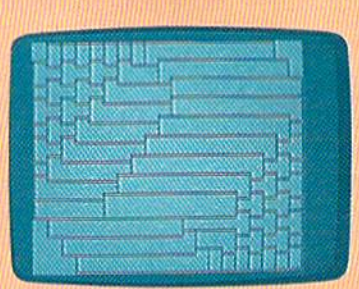
Brian Casey

Create dazzling displays that combine text and high-resolution graphics with this windowing utility for the 64.

Good graphics are often the key to an effective visual display, whether it's animation for a game or a graph for a business program. Unfortunately, high-resolution graphics, which provide the needed quality, are usually difficult to program. This difficulty has led to the creation of a wide range of utility programs designed to make it easier to incorporate high-resolution graphics into other programs.

Most of these utilities have easy-to-use commands for drawing on the hi-res screen, but putting text on that same screen is not as easy. These utilities force the user to choose between a hi-res screen and a text screen. One alternative is to use an interrupt to split the screen into horizontal bands. While this is definitely an improvement over having to alternate use of graphics and text, the programmer is still locked into using the entire width of the screen for one mode or the other.

"Hi-Res Windows" is a far better alternative. With this program, you can easily define one or two windows on the screen for hi-res graphics and leave the remainder of the screen free for text. The windows may be placed anywhere on the screen and even duplicated in several different locations. Text may even be PRINTed inside the windows with ease.



Windows containing hi-res graphics are easily created and duplicated.

Getting Started

Program 1, Hi-Res Windows, is written entirely in machine language. Use "MLX," the machine language entry program found elsewhere in this issue, to enter it. When MLX prompts you, respond with the values given below.

Starting address: C000
Ending address: C95F

Once you've entered all the data for Hi-Res Windows, be sure to save a copy to disk with the filename WINDOWS.ML (Program 2 expects to find a file with this filename).

Program 2, "Hi-Res Windows Demo," is a BASIC program that demonstrates how to use Hi-Res Windows from a BASIC program. Use "The Automatic Proofreader" when entering Program 2, to prevent typing mistakes. Save a copy of the program to the disk containing Program 1 when you've finished.

The Commands

A summary of the available commands and their parameters follows below (see the table of commands for the corresponding SYS addresses). Hi-Res Windows allows you to define one or two windows on the screen at once. Most commands behave similarly in both windows. The differences are detailed below.

To use a function, either in a

BASIC program or from direct mode, type **SYS *address, parameters***, where the address and parameters are given in the Command Table. To turn window 2 off, for example, you would use the command SYS 49202. The accompanying demo program is a good example of how the commands may be used from within a BASIC program.

DEFINE-WINDOW,*x-size,y-size*
Defines the size of a window and prepares it for drawing. For window 1, *x-size* and *y-size* refer to how large, in characters, you wish the window to be. (A character is eight pixels high by eight pixels wide.) The value for *x-size* may be in the range 1–40, and *y-size* may be a number from the range 1–24. Because window 1 is implemented using redefined characters, the product of *x-size* and *y-size* may not exceed 255. For window 2, *x-size* and *y-size* refer to how large, in sprites, the window will be. (A sprite is 21 pixels high by 24 pixels wide.) Each value may be in the range 1–8, and the product of the two must not exceed 8.

WINDOW-OFF
Turns off the graphics window. For window 1, the entire screen is cleared to remove the garbage characters left behind. The screen is not cleared when window 2 is turned off.

SET-COLOR,*color*
Sets the pen color for all of Hi-Res Windows' drawing functions. The value for *color* may be in the range 0–255, but only the values 0–15 are distinct colors.

DRAW-WINDOW,*x-position,y-position,x-expansion,y-expansion*
Draws the graphics window with the upper left corner placed at the location *(x-position, y-position)*. Both *x-position* and *y-position* are measured in characters for window 1 and in pixels for window 2. For window 1, *x-position* may be a number from 0 (the left side of the screen) to 40 − *x-size* (the position at which the right side of the window is against the right side of the screen). Similarly, *y-position* may be a number from the range 0 to 25 − *y-size*. For window 2, *x-position* may be a number from the range 0 (the left side of the screen) to 345 (the position at which the window is completely off the right side of the screen), and *y-position* may be a number from the range 0 (the top of the screen) to 224 (where the window is completely off the bottom of the screen).

Window 1 doesn't use *x-expansion* and *y-expansion*. Window 2 may be expanded (doubled in size) in either the horizontal or the vertical direction. A value of 0 for either *x-expansion* or *y-expansion* draws the window in the normal size. A value of 1 for either expansion value will double window 2's size in the corresponding direction.

CLEAR-WINDOW
Clears all pixels in the window to the background color.

REVERSE-WINDOW
Reverses all pixels in the window. All pixels that are on are turned off; all pixels that are off are turned on.

PLOT-POINT,*x,y*
Plots the point in the current pen color at pixel *(x,y)*. For window 1, *x* may be a number from 0 (the left side of the window) to 8 × *x-size* − 1 (the right side of the window), and *y* may be a number from 0 (the top of the window) to 8 × *y-size* − 1. Likewise, for window 2, *x* must be in the range 0 to 24 × *x-size* − 1, and *y* must be in the range 0 to 21 × *y-size* − 1.

UNPLOT-POINT,*x,y*
Erases the pixel (sets it to the background color) at position *(x,y)*, where *x* and *y* have the same restrictions as in PLOT-POINT.

REVERSE-POINT,*x,y*
Reverses the pixel at *(x,y)*. If the pixel is on, it is turned off; if it is off, it is turned on. The parameters *x* and *y* have the same restrictions as in PLOT-POINT.

DRAW-LINE,*x1,y1,x2,y2*
Draws a line, in the current color, between points *(x1,y1)* and *(x2,y2)*. Again, the coordinates must lie within the ranges given for PLOT-POINT.

ERASE-LINE,*x1,y1,x2,y2*
Erases a line (sets it to the background color) between points *(x1,y1)* and *(x2,y2)*. The coordinates must lie within the ranges given for PLOT-POINT.

REVERSE-LINE,*x1,y1,x2,y2*
Reverses the line between points *(x1,y1)* and *(x2,y2)*. Points that are on are turned off and points that are off are turned on. The coordinates must lie within the ranges given for PLOT-POINT.

How It Works

One of the nicest features of the Commodore 64 is its ability to redefine the character set. Many programmers take advantage of this to create new letters or graphics characters. This technique is used to create window 1. The bytes of the new character set are arranged just like those of the hi-res screen. By treating this area as a set of bytes and putting the characters together in the right order on the screen, the illusion of a hi-res bitmap is created.

Window 2 uses a similar approach, but it uses sprites instead of characters. By properly aligning the sprites and keeping track of which bit corresponds to which *(x,y)* position, hi-res graphics are simulated.

These methods have several advantages over other techniques. One of the most important advantages is that the window need not cover the entire width of the screen. With the order of the onscreen characters rearranged, window 1 may be almost any rectangular shape. Since there are only eight sprites available, the shape of win-

Command Table

Function	WINDOW 1	WINDOW 2
WINDOW-ON	49152,*x-size,y-size*	49199,*x-size,y-size*
WINDOW-OFF	49155	49202
SET-COLOR	49158,*color*	49205,*color*
DRAW-WINDOW	49161,*x-pos,y-pos*	49208,*x-pos,y-pos, x-expand,y-expand*
CLEAR-WINDOW	49164	49211
REVERSE-WINDOW	49167	49214
PLOT-POINT	49170,*x,y*	49217,*x,y*
UNPLOT-POINT	49173,*x,y*	49220,*x,y*
REVERSE-POINT	49176,*x,y*	49223,*x,y*
DRAW-LINE	49179,*x1,y1,x2,y2*	49226,*x1,y1,x2,y2*
ERASE-LINE	49185,*x1,y1,x2,y2*	49233,*x1,y1,x2,y2*
REVERSE-LINE	49192,*x1,y1,x2,y2*	49239,*x1,y1,x2,y2*

dow 2 is slightly more limited.

Another advantage of Hi-Res Windows is the ease with which text may be written into either window. Rather than each letter having to be drawn pixel by pixel onto the hi-res screen, the characters may be printed as if they were on a normal text screen. For window 1, this ease is a side effect of treating the new character set like a hi-res bitmap. Since the window is really just a group of redefined characters, the characters can simply be overwritten with any other character.

Window 2 is even more powerful in terms of handling text. Sprites may appear on top of or behind characters. To see this effect, PRINT some characters on the screen and position window 2 so that it overlaps the characters. Location 53275 (register 27 of the VIC chip) controls whether sprites appear in front of or behind text. Each bit of the register corresponds to one sprite (0–7). If a sprite's bit is set to 0, it will be behind text. If its bit is set to 1, it will appear in front of text. Different values in this register will make different parts of the window transparent or opaque.

One other nice feature of using characters as a hi-res bitmap is that the window may be duplicated any number of times at various positions on the screen. This technique is illustrated in the Hi-Res Windows Demo program.

Since Hi-Res Windows uses redefined characters to draw window 1, the old shape definitions are lost. To minimize this effect, Hi-Res Windows always uses the last characters available. That is, it works backward from character 255 and only uses as many characters as are necessary. Since the reversed set of graphics characters is used first and the normal numbers and characters are used last, this penalty is not usually significant.

Since Hi-Res Windows uses sprites to draw window 2, some or all of the sprites are lost. Again, this effect can be minimized. Window 2 only uses sprite blocks 224–231 for its shape definitions. Any other blocks may be used for sprites by changing the values in 2040–2047. As long as blocks 224–231 are not disturbed, the window may be recovered by resetting 2040–2047 to 224–231 and redrawing the window.

One other limitation of the windows involves size. Since the character set is being used to display graphics in window 1 and only 255 characters can be used at once, the window may not exceed 255 characters in size. Likewise, window 2 is composed of sprites and may not exceed eight sprites in size (the maximum available on the 64).

Color is handled slightly differently in each window. Because window 1 is composed of characters, only one color may be used in each 8 × 8 pixel square. Likewise, because window 2 is made up of sprites, only one color may be used per 24 × 21 pixel area. Also, the color of each block of window 1 is determined by the screen's color memory. When window 1 is DRAWN, the entire window is drawn in the current color. Window 2's color, on the other hand, is independent of its position on the screen, so DRAWing the window has no effect on the text colors in the window.

See program listing on page 78. **G**

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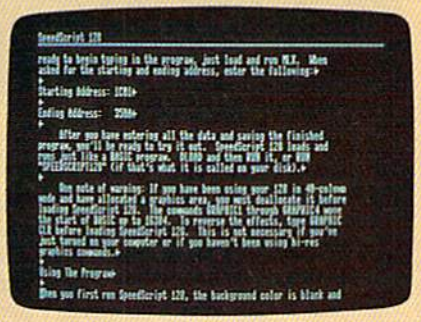

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REVIEWS

Who Framed Roger Rabbit

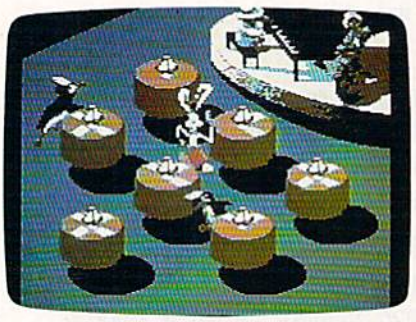
Breathes there a man with soul so dead that he's never seen the movie *Who Framed Roger Rabbit*?

Well, yes, there is one on the staff of this very magazine, who pleads business pressures as the reason for his missing out on the Roger Rabbit phenomenon. (Not me. Hanging prominently on the wall in my office is a poster featuring Jessica Rabbit.) *[Our busy staff member has since seen the film and reports he loved it.—Editor]*

It's difficult enough to adapt a movie to a computer game, but it's especially difficult when legions of fans can recite whole passages of dialogue from the movie. After all, this was the top-grossing movie of 1988.

Who Framed Roger Rabbit is the first software publishing effort of Buena Vista—whose parent company, Walt Disney Productions, played a large part in making the movie. As a game, it succeeds on several levels, but not all.

First, there's the simplification of the plot. As outlined during the title sequence, Roger has been framed for murdering Marvin, the Gag King. Unless he



can find Marvin's missing will, Judge Doom will sentence Roger to a vat of deadly Dip. And ToonTown, where all the Hollywood cartoon characters live, will meet the same ghastly end.

The first level of the game is a race through the streets of Hollywood, circa 1947. Roger's vehicle is Benny the Cab. You can use your joystick skills to help Benny avoid the other autos, puddles of Dip, and streetcars. Being a Toon, Benny also has the ability to leap onto buildings and race across their rooftops.

You can also help by touching the various icons on the sides of the buildings, but you'll have to master the art of making Benny jump in order to reach them. Pairs of rubber gloves protect Benny from puddles, wheels add a burst of speed, and diamonds remove a bucket of Dip from your score. (A bucket of Dip is the equivalent of the familiar used-up life.)

> ***The characterizations and actions are so true to the film that even purists are not likely to quibble.***

The race ends when you arrive safely at the Ink and Paint Club after having avoided the many hazards, including a van that's full of the Judge's weasels. If you've seen the movie, you'll remember the club. It's the hangout for Toons, where the waiters are formally dressed penguins.

You've come to the club to look for Marvin's will. It's a scrap of paper on one of the tables, but there are many scraps and many tables, and the waiters are delivering more. The only thing you can do is race around the tables, grab every piece of paper, and sort out the correct one later.

But don't touch those drinks! Like all the Toons, Roger goes bonkers when he takes a drink. The resulting spasms and wild gyrations will cost you valuable time. Another hazard is the bouncer, who is, quite literally, a big gorilla. Get too close to him and he'll eject you from the club, earning you yet another vat of Dip.

After another race across town, the climax of the game takes place at the Gag Factory—the one where all those crazy devices with Acme labels are manufactured. The weasels have caught up with you, and you'll have to find and use the gags to disable them. Being Toons, weasels laugh themselves to death. So the faster you use the gags, the sooner you'll be rid of them.

Even this isn't the end. You still have to meet with Judge Doom, and it really wouldn't be fair to reveal what happens next. Besides, I haven't survived enough of the game to know.

In all the levels I've seen, the animation is almost as smooth as good movie animation. The characters themselves have sawtooth edges, robbing them of some detail, which I assume is due to the limitations of the computer. The music and sound effects help sustain the illusion that you're controlling a movie.

At the end of each segment is an interlude consisting of a still picture and comic-balloon dialogue. The message may either be congratulatory or feature your Roger persona scolding himself for failure.

The documentation is slight, reflecting the simple game rules. A Gag Factory catalog is included in the package. The catalog forms part of the copy protection—but even if it weren't necessary, it would be recommended reading. Not only is the catalog as silly as it should be, but it successfully emulates the style of magazine ads from long ago.

I do have several technical complaints about the game. First, it takes a ridiculous amount of time to load. I clocked it at seven minutes, although you can cut out about four minutes by pressing the space bar when the first title screen appears.

Second, there are long loading delays between the acts—giving you

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enough time to refill your coffee cup and lose the competitive edge on your joystick.

Third, once the game is lost, there's no way to restart it except by resetting your computer and doing a complete load. Worst of all, I've been unable to reach any level where Jessica Rabbit makes an appearance. (If you've seen the movie, you know the great care that was taken in her animation.)

In the end, a true adaptation of *Who Framed Roger Rabbit* is impossible. The charm of the movie relied to a large degree on the imaginative combination of the live actors and the animated Toons. The two worked so closely together that the magic seemed real. Of course, you don't see live actors in a computer game; some things are still beyond our current technology.

Even so, the game manages to retain the important plot elements, and the characterizations and actions are so true to the film that even purists are not likely to quibble. With all this going for it, it's a shame that the loading delays take away so much of the fun.

—Ervin Bobo

Who Framed Roger Rabbit
Buena Vista Software
500 S. Buena Vista
Burbank, CA 91521
$29.95

Ikari Warriors and Victory Road

Sounds like a new samurai double feature playing at the art-film theatre. Actually, it's two new games from Data East.

Ikari Warriors is a game in which a lone fighting man battles against fearsome odds as the action scrolls up the screen. You can't reverse or fight left or right, although there is limited horizontal movement. *Ikari Warriors* is like *Bazooka Bill* turned 90 degrees.

Ikari Warriors

On some computers, *Ikari Warriors* is a true two-player game, where each player controls an Ikari warrior. On the 64 version, it's a one-player game. (They should have changed the name to *Ikari Warrior*.)

The enemy's movements are fairly predictable, so the game requires memorizing a path through the carnage. Because of its narrow horizontal scale and single sustained battle, *Ikari Warriors* is a less successful combat game than *Airborne Ranger*. *Ikari*'s graphics and animation are not quite as good as *Airborne Ranger*'s, but if you liked *Ranger*, you'll probably like this one, too. It isn't a cartoon adventure like *Bazooka Bill*, either. There's something deadly earnest about *Ikari Warriors*. It takes itself very seriously.

These fast-paced, white-knuckle games depend heavily on manual dexterity and memory.

As you mow down the enemy, their bodies disappear. In some cases, the bodies are replaced by tokens (letters in rectangles) that you can capture by moving over them. With some tokens, you acquire superbullets and the ability to kill everyone on the screen (except yourself) with a single shot—sort of a neutron hand grenade. Other tokens are good for longer-range bullets and tank shells, additional bullets (you'll quickly need them), grenades, and gasoline (for a tank your warrior might steal).

I'm troubled by the lack of a scenario in *Ikari Warriors*. You're dropped in the combat zone without a name and without knowing who the enemy is or why you're fighting. That makes it tough on the reviewer, who usually depends on the badly written scenario for great *bons mots* and sarcastic toss-offs.

Without a scenario, the battle becomes less personal. You're the lone good guy and everyone else is the enemy. This aspect of the game is probably intentional, contrived so that the product can be sold without modification in many different cultures. In Angola, the enemy might be South Africans. In Afghanistan, the enemy might be Russians. In Detroit, Toyota salesmen. Personally, I like to think of the warrior as an avid golfer named Danny, chipping away with his nine-iron at an armed, militant faction of the ACLU. But you can make up your own interpretation of the game.

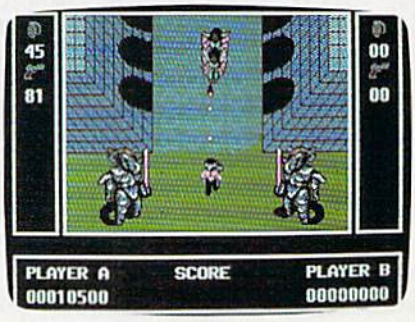
Victory Road is supposed to be a sequel—or part 2—of *Ikari Warriors*, but the two games have little in common except for their fast pace, slow-firing weapons, and simple graphics.

Victory Road is the more interesting of the two. Instead of battling a nameless, faceless foe, you're pitted against super-demons, winged man-beasts who shoot lava bullets, gremlins, and various other beasties rarely seen outside fairy tales. (Sounds a little like *The Wizard of Oz*, doesn't it?)

Fortunately, this game has a scenario: The evil Stonehead and the previously mentioned undesirables are threatening to take over the universe. At least, that's the explanation for all the bloodshed. Personally, I would kill gremlins just for the heck of it.

The *Victory Road* landscape is barren. In some places, a rudimentary road is laid out and marked with colored stones, but for most of the game you must find your own path among the Mayan pyramids.

You'll be confronted periodically by superdemons, who resemble the masks used by the witch doctors in old Tarzan movies. The game designers suggest blasting them repeatedly in the middle with grenades. Since my aim is poor, I ended up missing more demons than I hit. I did discover that some of them can be shoved around with the concussion of near misses.



Victory Road

Periodically, you'll find a flame thrower and lightning bolt lying on the ground. The flame thrower is virtually essential to your success. Grab it and stay alive. Lose a life and you'll lose the flame thrower. The lightning bolts are similar to the neutron hand grenades. If stepped on, they'll destroy every creature on the screen except Danny.

You're equipped with a rifle and an infinite supply of conventional hand grenades, but the rifle fires painfully slow bullets. If I were the enemy, I would simply dodge them. The hand grenades have a severely limited range. As I said, your success rides largely on

your ability to locate and hold on to a flame thrower.

Neither of these games likes the 1571 disk drive. (Will some program designer somewhere please make the fast-load modules and other 1541-specific tricks optional so that those blessed with a 1571 can play your game?)

In the final analysis, these are fast-paced, white-knuckle games that depend heavily on manual dexterity and memory and very little on intellect. The music isn't as inventive as *Bazooka Bill*'s and the scenery isn't as detailed as *Airborne Ranger*'s, but *Ikari Warriors*' ground action will remind you of both of these games.

Ikari Warriors allows limited horizontal movement and is the more realistic of the two games. *Victory Road*, which is limited horizontally to a single screen width or less, is more challenging, but is about as realistic as the ancient computer game *Venture*.

—Robert Bixby

Ikari Warriors
Victory Road
Data East
470 Needles Dr.
San Jose, CA 95112
$29.95 each

Decisive Battles of the American Civil War, Volume III

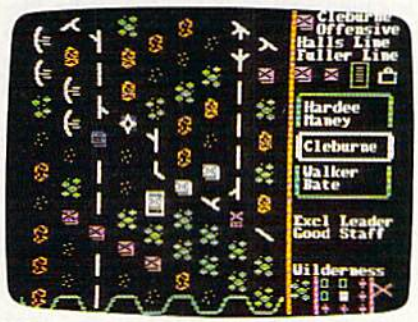
If you've been holding your breath for the Civil War to end, you can now breathe a sigh of relief. With the release of *Decisive Battles of the American Civil War, Volume III*, Australia's Strategic Studies Group has completed its three-part tactical study of the War Between the States. Volume I includes the early years, Volume II spans the middle period, and now, with Volume III, the later battles are covered. The series begins in May 1864 with the Battle of the Wilderness (Grant vs. Lee) and ends with the Battle of Nashville, fought between Thomas and Hood in December of the same year.

While none of the scenarios depict Lee's surrender at Appomattox, those included demonstrate quite well why that surrender took place. With only one real exception (the Battle of Franklin), the Confederacy is on the defensive. Historically, Lee's plan was to be on the strategic offensive and the tactical defensive (in Civil War battles, the defense had the advantage). In these scenarios, however, the South's defensive positions are the result of the strategic advance of the Union troops. Unlike the other two volumes in the series, this one makes it more enjoyable to play the Union side in most of the scenarios. Somehow, the South seems more desperate.

The game system is much the same as in the first two volumes, retaining many of the characteristics of SSG's original Battlefront system. Simply put, everything is controlled by a complex but usable series of menus. The opening menus let you choose and edit a scenario and then customize the game to suit your own taste. The most important choices at this stage are the Exposed, Enhanced, and Radio options. Switching on Exposed makes all the units on the maps visible at all times, while Enhanced gives bonuses to the forces controlled by the computer. If you turn Radio on, you'll control all of your force's units.

For the first few games, you'll want to turn Enhanced off, but Exposed and Radio on. Soon, however, a desire for realism will set in, and you'll turn Exposed and Radio off. This means that only those enemy units your own units can see will appear on the map—the rest will be hidden—and it will be much more difficult to communicate with your own units. The effect is fascinating—you'll have all the realism you want. But in other ways the game will be less satisfactory. More on this in a moment.

It's possible to play the game with two human opponents, one controlling the Union, and the other, the Confederacy. In a two-player game, both players plot their moves separately; then the computer carries out the orders. In the solo game, you make your moves, the computer carries out your commands, and then the computer executes its own commands.



From the Operations menu, you can choose Personal, Command, Order, or Resign. Each of these operations, with the obvious exception of Resign, takes you to a separate submenu. With Command, you can put the corps or divisions under your control on the Offensive, on the Defensive, or in Reserve; in all three cases, you play the role of the overall commander of the battle (Lee in the Wilderness scenario or Joe Johnson in the Atlanta scenario). The Orders option lets you command individual brigades. These you can send to a specific objective, deploy into battle formation, regroup around a headquarters, or put into reserve when they're exhausted. Once in battle, you can order the brigades to assault, skirmish (a lighter attack), advance into battle, or withdraw from battle.

Unlike the previous volumes, this one makes it more fun to play the Union side. Somehow, the South seems more desperate.

Back at the Operations menu, the Personal option takes you to your own headquarters. From there, you can move the headquarters to a different battlefield position, which is especially important if the Radio option is turned off and some of your army is out of your command range. You can also enter the excellent Profile submenu, where you can adopt a Heroic, Bold, Sensible, or Cautious stance for yourself. Heroic lets you personally affect the outcome of a nearby combat by giving the brigades you lead a combat bonus (at the expense of your headquarters' staff). Bold is less effective, but also less dangerous. Sensible is normal, while Cautious is just a bit less inspiring. These profiles capture the flavor of the Civil War battlefield, where, to a large degree, the commanders personally directed the troops.

As we've come to expect from SSG, the manual for Volume III is detailed and contains a lot of background material. Considerable space is given to describing how the game system works, even though we don't really need to know all the details. The manual provides a short historical account for each scenario and a section of general playing hints. As in all SSG games, a design system is included for those who wish to create their own scenarios or alter the existing ones. Additional scenarios are available from SSG through its support magazine, *Run 5*.

I noted above that too much realism can work against your enjoyment of the game. To close this review, let's return to this curious dilemma. Simply put, the more you tailor *Decisive Battles* to reflect the actual conditions of the

Civil War battlefield, the less enjoyable the game becomes. This dissatisfaction is due to the lack of control experienced by the actual Civil War commanders: Once the battle had begun, there wasn't a whole lot a commander could do. Those who tried to maintain an overall command of their troops would often set things in motion only to find themselves merely waiting for the outcome. On the other hand, those who took direct control of one part of their army often found they also had to give up control of another part.

With the Exposed and Radio options turned off, you'll simulate the actual battle situation. In game terms, this means you'll spend a lot of time simply trying to get your headquarters into position so you can do something. And even then, there won't be much you can control. In effect, this removes the game from the player's control. Realistic, yes; fun, hardly. I certainly wouldn't criticize this fine game for doing what it does so well, but, personally, I play the game with the Radio option on, as I want more say in changing history. A strange objection, but one I suspect others will voice as well.

Despite all this, *Decisive Battles of the American Civil War, Volume III* brings the series to a very strong conclusion. What's next? How about a series of Napoleonic volumes, then maybe Frederick the Great, then Marlborough, then into the Middle Ages, and on to ancient times? Sure it's a pipe dream, but, well, why not?

—Neil Randall

Decisive Battles of the American Civil War, Volume III
Strategic Studies Group
Electronic Arts
P.O. Box 7578
San Mateo, CA 94403-7578
$40

1581 Toolkit

Question: Name two orphans whose parents are still alive.

Answer: The 1750 RAM Expansion Unit and the 1581 disk drive.

These two semiorphans have a lot in common. Both represent significant advances for highly popular, widely available computers. The 1750, if it can be found, elevates the 128 to the league of the IBM PC in terms of available memory. The 1581, more widely available, elevates the 64 and 128 to the league of the ST, Amiga, Macintosh, and PS/2 machines in terms of mass storage. Neither seems to have made an impact on the collective unconscious of most software developers.

1581 Toolkit is designed to make the operation of the 1581 drive more friendly and accessible. It provides a set of disk utilities that simplify disk-management functions, such as copy and format. It also includes a reference guide that takes up where the rather thin 1581 manual leaves off, providing a memory map of the 1581's ROM and RAM and a monitor for exploring its insides.

Because *1581 Toolkit* didn't know I had a RAM expander, it copied my disks at a rate of five tracks per pass, a time-consuming process that required 32 disk swaps. It would have taken just four swaps if the program had taken advantage of the 640K of available RAM, instead of limiting itself to the stock amount of RAM. (Sudden inspiration: Software developers should abandon copy protection and instead provide copy utilities on their disks. Invite hackers to make as many copies as they like, but make the copy procedure so tedious no one could go through it more than once and retain his or her sanity. That would certainly make pirates easier to identify: They'd be the ones drooling in their shoes.) In case you were wondering, *1581 Toolkit* will not copy copy-protected disks.

Supposedly, if you have two 1581 disk drives, you can select *dual* before the disk copy and then copy disks from one drive to the other, thus eliminating disk swapping. Unfortunately, after hours of trying, I was unable to coax the *1581 Toolkit* to follow through on this promise. It preferred to hang up, complaining of disk read errors. The only recourse in the case of such a crash was to reboot. It took only a few seconds, but it was irritating. To be fair, this might have been the fault of the disk drives I was using. Both were unmodified drives purchased over a year ago.

Somewhat faster and less troublesome than the disk-copy utility (which is called Fast Data Copier) is the file-copy utility, Fast File Copier. This utility doesn't make an exact sector-by-sector copy of one disk onto another. It copies only selected files to another disk.

This utility is fast. It's similar to the XCOPY command in MS-DOS versions 3.2 and later: First it reads all the selected files that can comfortably fit into the computer's memory; then it writes them in the same order to the destination disk. It has Uni-Copy (the file-copying utility provided on the 1581 Test/Demo disk) beat cold.

The file-copy utility is liberal: By that I mean generous, nondiscriminatory, and willing to make allowances. In the case of the *1581 Toolkit* file-copy utility, it means that it will read and write files among a variety of drives. It won't reliably copy GEOS files, however.

The *1581 Toolkit* includes a fast track-and-sector editor that provides 14 different options for viewing the disk, including a disassembly of the current sector. It would be nice if, when you scanned to the end of the current sector, the disk editor would automatically jump to the next sector. Unfortunately, to move to the next sector, you must return to the main menu (by pressing the left-arrow key) and press J with the cursor on the first byte of the sector. This could have been a little friendlier, but then, that's what upgrades are for.

Needless to say, you can not only read from the disk, but also write to it. This editor is fast and friendly, and it provides onscreen help. Like most of these utilities, this one is for the 1581 only.

1581 Toolkit's *Fast Load utility delivers as promised; it's 900-percent faster than DOS.*

File T & S (Track and Sector) Tracer is another disk editor included in the package. When you enter the filename and press RETURN, it provides a graphic representation of the entire disk and the location of the specified file. You can cursor through this display and press RETURN to open up the actual sector and examine its contents.

Your examination can be in the form of a hex dump or disassembly. If you opt for the disassembly, you can actually alter the contents of the disk in assembly language. Simply type over the existing disassembled code with valid 65*xx* opcodes, and the track-and-sector tracer will write the resulting machine language code directly on the disk. Once again, this utility works only on the 1581 drive.

How many times have you wanted to search a disk for information? If you're a writer or programmer, this problem comes up constantly. In which file was your character named *Joana* and in which file was she named *Gretchen?* Is your PLOT routine in any of the assembly language source files on the disk?

The pattern searcher accepts a search string in quotation-mark-delimited ASCII or in hex or decimal values. Then it rapidly examines each track on the disk, counting the number of times a given string appears on the disk until a sector buffer is full. You can select the track through a graphic representation of the sectors that contain the search information. You can then view or edit the contents of the track.

The display of information is either in hex or assembly language. Neither display was of much use to me with *SpeedScript* files (which are stored in Commodore screen codes rather than in ASCII), but if you're using a word processor that generates ASCII, this would be enormously useful. I hope the programmers will consider providing a *SpeedScript*-compatible display in the upgrade.

The practicality of this utility is enormous and by itself would justify the purchase price of this product.

Confirmed readers of the manual may be aware that the 1581 is capable of supporting partitions and subdirectories. If you're like most, though, you've treated your 1581 like a jumbo 1541 and have ignored the manual's hieroglyphic explanation of the 1581's advanced features.

The package also includes a partition creator, which is supposed to be fast and easy to use. Unfortunately, it doesn't seem to work with older 1581s. I purchased mine in the fall of 1987, and this particular utility wouldn't work properly on my drive. It did seem to work satisfactorily with a slightly newer drive.

A utility like this shouldn't even be needed. Commodore should have provided some sort of support for subdirectories, including the BASIC 7.0 commands. The company could have at least provided a more understandable explanation in the 1581 manual.

There is a simple, highly usable partition and subdirectory creator on the 1581 Test/Demo disk called Partition Aid that worked with both drives.

If you would prefer to do your subdirectory work in immediate mode, here's a brief explanation. To create a partition on unit 9 named *P1* and large enough to make into a subdirectory (120 blocks minimum, with 40 blocks taken up by the subdirectory) which runs from track 41, sector 0 to track 44, sector 39, you use this amazing string of characters:

```
OPEN15,9,15,"/0:P1,"+CHR$(41)+CHR$
  (0)+ CHR$(120)+CHR$(0)+",C"
```

Then you have to format the partition to endow it with a directory, thus creating a subdirectory.

To go to this subdirectory on unit 9, enter

```
OPEN15,9,15,"/p1":CLOSE15
```

To return to the root directory, use the following:

```
OPEN15,9,15,"/":CLOSE15
```

Partitioning a 1581 disk provides unusual benefits. You can individually format each partition as if it were a separate disk. This allows you to use more efficiently the large space on the 1581 disk. By going to the root (outside of all partitions), you can format the entire disk at once, or you can scratch the partitions (thus clearing out all partitions or subdirectories).

Is the partition utility easy to use or, as the manual claims, "fun"? It seemed fairly complicated to me, and the manual wasn't as helpful here as it was in other areas.

The partition and subdirectory capability of the 1581 is easy enough to use from BASIC. Try it out on a blank disk. I think you'll be amazed at how quickly you become adept at its use.

The 1581 will format an 800K disk in 100 seconds. That's not a ridiculously long time—the PC takes about 60 seconds to format a 360K disk. The Fast Format utility takes 70 seconds to format a 1581 disk, which confirms the manufacturer's claim that the format is 30-percent faster.

The *1581 Toolkit* Fast Format offers something the Kernal format can't: partial formatting. You can format any set of contiguous tracks that includes track 40.

Why? I can't imagine. But I'm sure someone could find a use for this utility. Unfortunately, after a partial format, the disk appears to have no directory. There's nothing about this in the manual. Track 40 is full of zero bytes, like all the rest of the tracks on the formatted disk.

I have often wished there were a CHKDSK (check-disk) command available for Commodore disks. The Validate command is of limited use against the kind of disk errors that can creep in.

The Error Scanner quickly scans the disk and indicates the state of all the tracks and sectors with a graphic representation. When the scan is completed, you can dump the graphic representation to an odd-numbered Commodore printer.

The Error Scanner detected that a partially formatted disk was not properly formatted with the older drive: The format skipped over several tracks. A scan of a disk formatted on the newer drive detected no errors.

Another utility on the *1581 Toolkit* disk is a fast loader. The creators of this utility claim a 900-percent improvement with the use of their utility. As fast as the 1581 is, could this be true? Here are the results of my tests:

Number of Blocks	Seconds to load	
	Fast Loader	DOS
25	2	15
153	8	77
165	9	80

I'd say this claim is an honest one. Furthermore, the fast-load program itself is only seven blocks long (in two files) and is relocatable.

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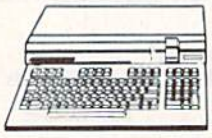

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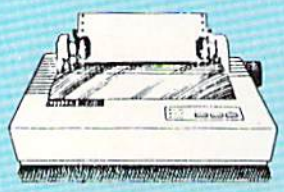
Citizen 120-D



If you are seeking world renowned printer performance for your home, look no further than the 120-D. Your data processing needs are handled quickly at a print speed of 120 cps (draft) or 25 cps (NLQ). The 120-D features 9 pin dot matrix print quality, standard parallel centronics interface and a 4K text buffer.

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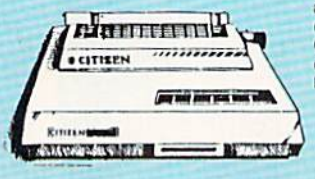
Citizen 180-D



You can always rely on the Citizen 180-D. From its price/performance value, to a print speed of 180 cps (draft) or 29 cps (NLQ) the Citizen 180-D is an excellent printer for the home or small business.

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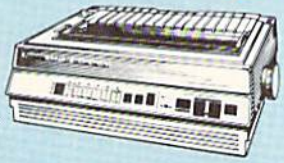
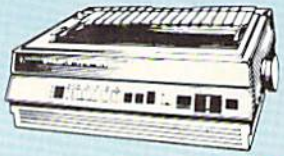


KX-P1191

Announcing the Panasonic KX-P 1191, a 9 pin printer with advanced features that put it ahead of its class. The 1191 features the EZ-Set operator panel that lets you access the most commonly controlled printer functions right from the front panel. The 1191 has other advanced features, including an adjustable push/pull tractor feed and multiple paper paths. All these features come packaged in a rugged, ergonomic design with a two year limited parts and labor warranty.



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KX-P 1180

The 1180 by Panasonic offers you more than what you might expect in a low cost printer. With multiple paper paths, versatile paper handling, and front panel programmability through the EZ Set Operator panel, the 1180 is an excellent value. The 1180 also features 2 excellent print qualities: Near Letter Quality and Draft, with speeds up to 192 cps in Draft and 38 cps in Near Letter Quality plus crisp, clear graphics.

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KX-P 1124

For excellent print quality in a high speed printer, choose the KX-P 1124. Its 24 pin print head produces draft text at a quick 192 cps (draft) or letter quality text at 63 cps. In addition, the KX-P 1124 provides such standard features as selectable push/pull tractor, 5 resident print fonts, parallel centronics interface and a standard 6K buffer. Panasonic's KX-P 1124 ensures that your printing will be fast and professional.

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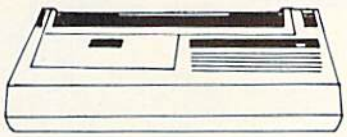

This affordable, personal printer provides full color graphics capabilities, near letter quality printing, and popular computer compatibility.

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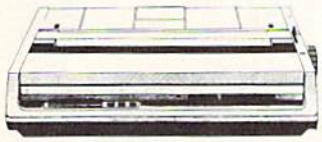
(Interfacing available)

Okidata 180



With a print speed of 180 cps (draft) and 30 cps (NLQ), the high performance Okidata 180 saves you time. Okidata has made operating the 180 easy with one touch control, a feature usually offered only on higher priced printers. This is a printer built for the long run. With great features, compatibility and speed, the Okidata 180 means real value for your printing needs.

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star micronics

NX-1000

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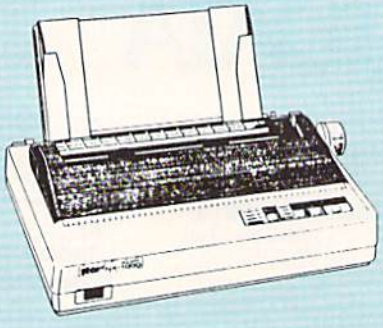

Star's answer to 9 pin dot matrix printers. A soft touch control panel and Star's paper park feature solves your multi-document needs. 144 cps draft and 36 cps NLQ give you high resolution 9 pin performance in an affordable package from Star.

Announcing STAR's NX-1000 Printer in 4 Models!

NX-1000c

With a Star NX-1000c printer your printing options will never cease to amaze you. The Star NX-1000c has standard Commodore serial interface for 64/128 computers. Print speed is selectable at 144 cps (draft) or 36 cps (NLQ) and paper parking will lend versatility to your document handling needs. The Star NX-1000c will fulfill your requirements to the letter.

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NX-1000 Rainbow

The Star NX-1000 Rainbow adds a whole new dimension to your work through multi-color printing. Star has designed 20 printing options into this printer. Add to this paper parking, Epson-IBM emulation, high resolution NLQ/graphics for a printer with extra talent over the competition. Star's NX-1000 Rainbow does all the work.

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NX-1000c Rainbow

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In addition to providing useful, often vital, information about the utilities in the *1581 Toolkit*, the manual provides useful information about the operating system of the 1581 disk drive. Well over half the manual is taken up with charts and memory maps that assist the programmer in using the 1581 drive. It contains a brief discussion of hardware bugs in the 1581. The disk that comes with the *1581 Toolkit* provides a diagnostic routine that checks the disk drive controller and the status of a jumper in the unit. These are the two things that were changed in the upgrades. According to this diagnostic tool, the two drives I have been using are identical, so why they operate differently is a mystery.

I did run into a number of problems with the *1581 Toolkit*.

The instructions indicate that the program can be loaded and run with a LOAD "*",9,1 instruction, but I was able to get this to work only in 64 mode. To run the program in 128 mode, I had to change my 1581 to device number 8 and boot from it.

The *1581 Toolkit* isn't consistently friendly. Sometimes there's no screen message to tell you what to do. For instance, when you're using the directory editor, there's no onscreen message to tell you to use the space bar to mark files or to use the cursor keys to move through the directory. There's also no indication of how to transfer the filenames from the input buffer to the output buffer. The manual gives a lengthy explanation of this process, but it would be nice to have a line of onscreen help.

The commands and menus aren't consistent across the utilities. In some situations, you must press the back arrow to return to the main menu. In others, you press a function key or select REBOOT MAIN MENU. In still other instances, you press the RESTORE key.

The utility uses the graphics screen, switching to 64 mode if started on the 128, which means that it doesn't take advantage of the 128's 80-column screen—yet another semiorphan—which would have allowed double-speed processing.

It was troubling how many operations could not be backed out of without rebooting. As a new user, I often found myself on the threshold of a fatal error, like reformatting the wrong disk or copying files from my destination disk to the source disk. There should always be a way to back out of operations as powerful as this.

Also, the *1581 Toolkit* doesn't like GEOS disks.

Most of my negative remarks concern design problems. A beginner will probably stumble over them, but after a few hours with the program, the idiosyncrasies should no longer be an obstacle.

A programmer interested in using the 1581 will value this package for its sector-reading utilities and its reference materials. A writer will appreciate the global disk-search routine. Anyone who uses a 1581 will appreciate the Fast Loader and the rapid File Copy routine. For the most part, the *1581 Toolkit* package is worthwhile.

—Robert Bixby

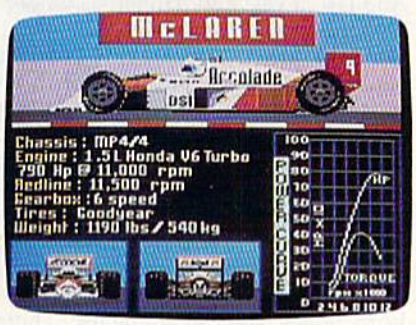
1581 Toolkit
Software Support International
2700 NE Andresen Rd.
Vancouver, WA 98661
$39.95

Grand Prix Circuit

Your McLaren Formula One racer screams down the long straightaway at Rio de Janeiro's Autodromo da Cidade. Shift into sixth gear, and the speedometer passes 190 mph before you ease off and hit the brakes. Then downshift, turn hard to the left, and power through the sharp curve at the end of the straight. The Honda Turbo engine almost sings as you head for the finish line.

After having suffered numerous spin-outs, crashes, blown engines, and last-place finishes, I finally tasted victory in *Grand Prix Circuit*, a high-speed racing simulation designed by Distinctive Software and distributed by Accolade. This package provides enough options, challenges, fun, and thrills to keep armchair drivers racing for hours.

Grand Prix Circuit offers a choice of three cars: a V-12, 3.5-liter Ferrari; a V-8, 3.5-liter Renault-powered Williams; and a Honda Turbo McLaren. Each car



has its own characteristics, and you might want to start with the Ferrari. It's a little slower than the others, but it holds the road better—and you'll need all the help you can get when you venture onto a track.

The designers at Distinctive, who also created *Test Drive*, have provided plenty of options in this simulation, making it very flexible. First of all, you can steer, accelerate, and brake with either a joystick, the keyboard, or the 128's numeric keypad. You can also shift gears with the fire button or use the keyboard, whichever you prefer.

Before climbing into the cockpit, however, you'll need to decide whether you want to practice on an empty course, enter a single race, or try the championship series of eight races on eight international tracks. In the championship series, you'll earn points and have a shot at the World Driving Championship on the international circuit.

How easy or tough do you want the action to be? There are five difficulty levels, ranging from Beginner to Pro. It's impossible to spin out or blow an engine on the easiest level, and you won't suffer any damage if you drive off the course. But it gets trickier as the skill level gets higher.

Next, you type in your name for the drivers' roster and choose from 1 to 99 laps per race. Then it's time to select a course.

I don't care if your name is Jackie Stewart—you won't soon outgrow **Grand Prix Circuit.**

The eight courses are modeled after actual Grand Prix tracks. I personally like Rio's Autodromo and Italy's track at Monza. I can think of a lot of adjectives for Japan's Suzuka International, but few are suitable for publication. Its 3.499 miles consist of hairpins, chicanes, S-curves, and a nasty tunnel whose wall I hit once at 80 mph.

After choosing one of the courses, you select your car. Then it's time to qualify. Your one-lap qualifying time determines your starting position.

Try to develop a light touch when steering or you'll be all over the road, and watch your speed on the curves. If you take them too fast, it's easy to end up in the grass or spin out. *Grand Prix Circuit* rewards you if you brake as late as possible before a curve, so take the turn tight, and then accelerate out of it. That's where you can eat up the competition. If you go in too fast, you'll hear an audible warning tone and see your damage gauge climb as you tear up the grass and your car.

I won the World Championship at Level 2 in a Ferrari, but I can barely qualify at Level 3. That's the beauty of this simulation. If you like to race, there's plenty here to keep you interested. The easier levels won't discourage rookies, and veterans will find plenty to

test their driving skills. Win a few races with an automatic transmission and then see how well you can change gears manually. I don't care if your name is Jackie Stewart—you won't soon outgrow *Grand Prix Circuit*.

The graphics are great. You pass grandstands and buildings, drive through tunnels, pass and get passed by other cars on the track. Clouds and planes float overhead, and Mt. Fuji even makes an appearance when you're racing in Japan. Check behind you in your twin rear-view mirrors, but blow an engine and all you'll see back there is smoke.

The sound is also good. The music can be toggled off and on, and your engine changes pitch as you maneuver around a course. Bump a car in front of you and you'll hear that, too.

Keep an eye on the tachometer when you're shifting gears manually. Push the needle past 11,000 rpm and you're liable to blow an engine. A digital speedometer helps you judge your speed before a turn. Don't try a hairpin at 100 mph unless you get a thrill out of plowing up the infield.

A damage indicator in your cockpit moves from green to yellow to red, depending on how many cars you've bumped and how often you've run off the track. Exceed the limits and you're out of the race. Once you're into the red zone, you should consider a pit stop for a change of tires. The screen changes to a bird's-eye view of your car as the pit crew goes to work. The damage indicator resets to 0 if you change all four tires. Some damage will still remain if you just change two.

Back on the course, your cockpit view has an optional course map that indicates the position of your car and the other cars. It also provides a preview of upcoming curves, straightaways, and tunnels. A race Information Box indicates your current lap number, lap time, elapsed time, and position. It's also optional.

A save-and-reload feature maintains your points and standing when you're racing the circuit, so you don't have to finish all eight races at one sitting. After each race, the game displays your name, race statistics, speeds, and best lap times. If your best time is among the top ten for a track, it's automatically recorded to the disk. If you finish in the top three, a special victory screen provides a postrace celebration, complete with champagne.

Grand Prix Circuit offers plenty of high-speed entertainment and thrills. If automobile racing appeals to you, you'll definitely want to take this package out for a spin.

—Tom Netsel

Grand Prix Circuit
Accolade
550 S. Winchester Blvd.
San Jose, CA 95128
$29.95

Mars Saga

Set on Mars in the future, *Mars Saga* is a science-fiction role-playing game that enables you to explore the planet as you try to complete a mission. Specifically, you're to assemble a team to find out why contact has been lost with Proscenium, the largest outpost on the planet. To reach Proscenium, you'll have to come up with the skills, equipment, and money necessary to begin a serious exploration.

There is a world to discover in *Mars Saga*—a sometimes treacherous one. You begin in Primus, the oldest city on Mars. Progeny is a city where it's best not to run up against the law. In the city of Parallax, criminals of all kinds form gangs, despite the best efforts of the police force. You won't see Proscenium itself for several hours. And last, a vast and dangerous wilderness lies between the cities.

Like practically all role-playing games, *Mars Saga* starts you off in an unfamiliar setting, with enough skills to get by but not enough to be effective. You must immediately find ways to raise your skill levels, obtain equipment, and so on; and you must recruit others to your cause as soon as possible. The ubiquitous computer stations will help you find ways to earn money. With money, you can do the rest. There are no automatic skill increases here; when you have enough money, you go to a training center, and then, if you succeed, you move to a higher level.

Recruiting is handled well. You can find recruits in bars, lounges, and restaurants, but the game won't allow you to recruit until you've proven yourself in some way. Once you're allowed to recruit, you interview and select potential recruits with the backgrounds you need—marine, police, medical, scientific, mining, and so on. You can fine-tune your team even further by inspecting each team member's attributes, skills, wealth, and weaponry before you actually recruit the team. Even so, you're bound to wish you had selected differently, especially in the early stages, so consider your choices well. Selecting a wealthy partner, for instance, won't do you much immediate good because he or she won't give you money until the two of you have worked together for a while. In other words, you have to build up a level of mutual respect.

Each character has nine attributes: might, agility, stamina, wisdom, education, charisma, health, sex, and age. Being male or female makes no difference as far as game functions are concerned, but age does. The education level determines how much a character can learn in a specific field, while wisdom determines perception and intuition. Each character's might, agility, stamina, and health are displayed on the screen at all times, in a sliding-bar format with colors depicting the severity of injury.

Mars Saga *is a strong role-playing game with a science-fiction setting that works extremely well.*

Your goal is to acquire as many of the 21 available skills as you can. The most noteworthy skills are administration, battle armor, electric, language, programming, strategy, and tactics; and there are supplemental individual weapons skills. Good administration skills let you persuade others (they work with your charisma attribute); battle armor represents the training needed to move around effectively while wearing armor. Your electric skill represents your understanding of electronics, your language skill determines how well you can handle the various

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languages and dialects found on the planet, and your programming skill determines how adept you'll be at hacking (you'll need this if you want to be successful). Strategy skills allow you to use military and political forces, and tactics skills allow you to effectively use available resources.

The skills of your team members should complement each other. Your character doesn't need to be skilled in all areas and is, in fact, better off concentrating on only a few areas. Recruit a doctor to handle medical problems, for instance, and a programmer to deal with hacking.

Mars Saga's screen shows the game from the perspective of your party while at the same time displaying an overhead map of the immediate area. A strategic map of the entire city is always available, with the unexplored sections shown as undefined black areas. A text window gives you the information you need. In addition to the main display, each building you enter has its own display. The buildings include hospitals, personal development centers, mine elevators, police stations, universities, combat training centers, munitions stores, and lounges and barracks—each with a different screen and a different set of options. How you handle the options will determine how successful you are.

The disks are not protected; the copy protection is handled by Electronic Arts' now-standard code wheel. Whenever you enter a city, you must find the appropriate symbols on the code wheel and enter the corresponding six-digit number. You can explore all of Primus and even leave the city before ever needing the wheel; by that time, you'll be so hooked on the game that you'll want to buy it. It's a very clever system and is much less aggravating than being asked for a word from the manual at the beginning of each session.

Mars Saga plays quickly, only occasionally pausing to read from the disk. The scenario offers a strong sense of mystery and intrigue, making it a fascinating game to explore. The combat can be handled solely by the computer, partly by the computer, or wholly by the player. The last method offers a solid tactical system (though it's more deadly than the computer-controlled combat). All in all, it's a strong role-playing game with a science-fiction setting that works extremely well—and is most welcome—on the Commodore 64.

—Neil Randall

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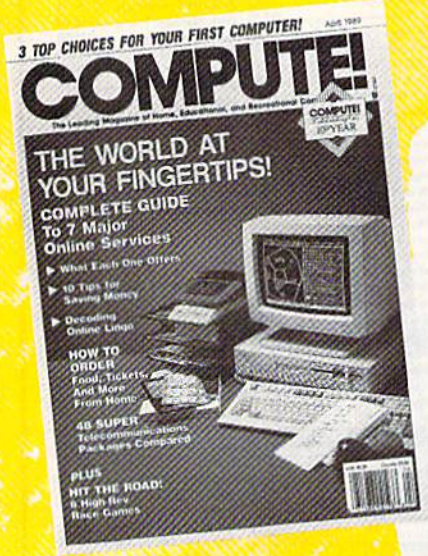
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RAM Wedge 128

Paul Redmond

Your Commodore RAM-expansion unit can be transformed into a superquick disk drive. "RAM Wedge 128" adds seven commands to BASIC 7.0 for easy access to expansion memory. Loads and saves from the ramdisk are up to 30 times faster than those from floppy drives.

BASIC 7.0 includes FETCH, STASH, and SWAP commands, but these commands expect you to do a lot of work: You must indicate the length of the transfer, keep track of where the data is stored, and remember how much memory is available for storage. RAM Wedge 128 does the hard work for you. You simply use its RLOAD, RSAVE, and RDIRECTORY commands, which are patterned after the familiar DLOAD, DSAVE, and DIRECTORY commands.

A ramdisk works like a floppy drive, but the information is lost when you turn off the power. A 1750 expansion module gives you a 512K ramdisk; the 1764 supports a 256K ramdisk; and the 1700 unit, 128K.

Typing It In

RAM Wedge 128 is written entirely in machine language, so use "MLX" when you enter the program. When prompted by MLX, respond with the values given below.

Starting address: 0400
Ending address: 0CD7

Type in the data for RAM Wedge 128. Before you exit MLX, be sure to save a copy to disk. To use this program with a 1764 memory expander, you need to create a special version of the program. Execute these commands to make a 1764-compatible version:

```
BLOAD"filename",B1
BANK 1:POKE 1596,4
POKE 2046,54:POKE 2047,52
BSAVE"RW1764",B1,P1024 to P3294
```

To activate RAM Wedge 128, type these commands in direct mode:

```
BLOAD"filename",B1
BANK 1:SYS 1024
```

A brief message confirming installation appears. You have three new commands at your disposal. The RDIRECTORY command gets a directory, RLOAD loads from the ramdisk, and RSAVE is used for saving. Make sure you save to a floppy disk before turning off your computer, because the ramdisk is erased whenever the power is turned off. In case of a crash, press the reset switch and type **BANK 1:SYS 1028** to restore the ramdisk.

Transform your memory expander into a powerful ramdisk with this short utility for the Commodore 128. Requires a 1700, 1750, or 1764 RAM-expansion module and a disk drive.

Ramdisk Commands

Most of RAM Wedge 128's commands correspond to disk commands. Any differences are described below.

RDIRECTORY displays the ramdisk directory and VERIFY flag. Each entry includes the filename, the ramdisk address, the ramdisk bank number, and the length in bytes.

RHEADER clears all entries from the directory. Confirmation is required because it irrevocably erases the ramdisk. The ramdisk is automatically formatted during installation; you don't need to initialize it as you would a blank floppy disk.

RVERIFY doesn't work like the normal disk VERIFY. Instead, it toggles the automatic verification that occurs during saves. A *V* in the directory indicates that verification is on.

RSCRATCH*"filename"* clears the selected filename(s) from the ramdisk. This command also requires confirmation.

RRENAME*"old filename"* **TO** *"new filename"* renames a file in the ramdisk.

RSAVE*"filename"* stores a BASIC program to the ramdisk.

RSAVE*"filename",Bx,start address,end address* works like BSAVE to the ramdisk.

RSAVE*"filename",start address,end address* saves a block from bank 0.

RLOAD*"filename"* loads programs. When used without parameters, this command loads a BASIC program from the ramdisk. When this command is followed by a comma (and a comma only), it loads data into bank 0 in much the same way LOAD*"filename"*,8,1 operates, but doesn't disturb the memory pointers. *Warning: Don't use RLOAD*"filename",*8,1—this may crash the computer. The 8 after the comma is interpreted as a start address.*

RLOAD*"filename",Bx* loads data into bank *x*.

RLOAD*"filename",start address,end address* BLOADs a file from the ramdisk into bank 0.

RLOAD*"filename",Bx,start address,end address* BLOADs a file from the ramdisk into bank number *x*, where *x* is 128 RAM bank 0 or 1.

Error Messages

RAM Wedge 128 contains a number of error codes that it displays to help you to determine what has

gone wrong. The following is a list of these messages and their probable causes.

UNRESOLVED REFERENCE occurs when you attempt to specify a bank number greater than 1. It also appears when a start-address-parameter variable name starts with the letter *b* without first specifying a bank.

VERIFY ERROR occurs when a discrepancy is detected during RSAVE with VERIFY on.

CAN'T CONTINUE ERROR occurs during RSAVE when the transfer did not complete and VERIFY is on.

TOO MANY FILES occurs during RSAVE when the directory is full (the ramdisk directory can have 64 entries).

STRING TOO LONG occurs when a filename exceeds 16 characters in length.

MISSING FILENAME occurs when the filename is a null string.

ILLEGAL QUANTITY occurs when the start-address parameter is higher than the end-address parameter.

OUT OF MEMORY occurs when the expansion RAM is too full to store your data.

Quick Switch

RAM Wedge 128 commands work in program and immediate modes. A BASIC RLOAD (one without any commas after the filename) is the only operation that disturbs BASIC pointers other than the COLDSTART routine (SYS 1024). When executed from within a running program, RLOAD resets the CHRGET pointers and runs the new program. This is equivalent to executing a LOAD inside a program. Because of the speed of RAM Wedge 128, this opens up some pretty interesting possibilities.

One technique involves the use of entire subprograms instead of regular subroutines. These would have access to all variables and, when finished, could exit by RLOADing the calling program, or any other program, into memory. All that's needed is a RETURN strategically located near the beginning of the calling program. All variables and stack pointers are left intact. In the following example, the first program calls the second program. Type and save the programs to the ramdisk using the RSAVE command. Use the name PROGRAM 1 for the first program and PROGRAM 2 for the second.

```
10 IF A% THEN RETURN:ELSE A%=1
20 REM THIS IS PROGRAM 1
30 PRINT"PROGRAM 1"
40 GOSUB 70
50 PRINT"BACK TO PROGRAM 1"
60 END:REM REPLACE WITH GOTO30
   TO CONTINUE SWAPS
70 RLOAD"PROGRAM 2"

10 REM SUBPROGRAM
20 PRINT"PROGRAM 2"
30 RLOAD"PROGRAM 1"
```

Disk vs. Memory

Each RDIRECTORY entry displays the filename, the ramdisk memory address, the ramdisk bank number, and the size of the file in bytes. The ramdisk directory doesn't indicate how much room is left. Each file must be saved into a single bank; it can't be split up. So if you had 15K free in bank 3 and 18K left in bank 4, you couldn't save a 20K file.

RHEADER doesn't need a disk name or ID. Files are automatically verified during saves. If you don't want verification, RVERIFY toggles the flag off. There is no ramdisk equivalent to the normal VERIFY command.

RSAVE may also be used like BSAVE, and RLOAD can emulate BLOAD. Just include a bank number and the starting and ending addresses to indicate block commands. For example, RSAVE "SCREEN",B0,1024,2024 saves screen memory to the ramdisk.

RAM Wedge 128 commands can use string variables as filenames and numeric variables for parameters. Formulas and BASIC functions may also be used. For example, use PEEK(51)/2 for *length* and MID$(F$,2,2)+".A" for *filename*. The bank parameter (that is, RLOAD"*filename*",B0 . . .) cannot be a variable, nor can the variable name of the start address begin with a *B* if a bank is not specified.

The * and ? wildcard characters are valid in load, scratch, and rename operations. Save with Replace (@:*filename*) first does an RSCRATCH and then an RSAVE. The RDIRECTORY command doesn't accept pattern matching such as RDIRECTORY"TEST*".

See program listing on page 81. **G**

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SHADES

Richard Penn

Give your text displays a commercial appearance with this short but powerful routine for the 64.

Advertisers and designers use color to make text bold and attractive. We've all seen letters on posters and advertisements which begin in one color and fade into another hue. "Shades" brings this capability to the 64. With this program, you can display standard text characters in four colors, creating color-fading effects. Shades is guaranteed to turn ordinary text screens into professional-looking displays.

Getting Started

Shades is a two-part program. The first portion of the program (lines 10–240) demonstrates Shades' features; the remainder of the program (lines 1000–1160) contains the machine language (ML) routine—stored in DATA statements—that actually colors the text. To prevent typing mistakes while entering Shades, use "The Automatic Proofreader," found elsewhere in this issue. Be sure to save a copy of the program to disk or tape when you've finished typing.

To install Shades, load and run the program. Once the ML data has been POKEd into memory, follow the instructions on the screen to view the character-shading effect. If you wish to use this routine in your own programs, include lines 1000–1160. (If you renumber these lines, be sure to set the variable RL at the beginning of line 1010 to the first DATA line in this subroutine.) Also, be sure to execute a GOSUB 1000 before using Shades' commands.

Three Commands

To access Shades' features, you must use three SYS commands. The first has the following format:

SYS 49152,*border,background,c1,c2,c3,c4*

This SYS call activates Shades; sets the border and background colors; defines the color of the top *(c1)*, upper middle *(c2)*, lower middle *(c3)*, and bottom *(c4)* sections of each character; and clears the screen.

"Shades" gives new meaning to the term multi-color text.

Each parameter following the SYS address can have a value in the range 0–15, representing the standard Commodore colors. So, for example, the command

SYS 49152,0,0,1,3,14,6

fades characters on a black background from white on top—through cyan and light blue—to blue on the bottom. Below is a table of color combinations that produce some interesting character shades on a black background:

c1	*c2*	*c3*	*c4*
14	1	8	7
1	7	8	2
14	1	8	9
6	14	3	1
6	14	8	2
5	7	8	9

To determine the best combinations for other background colors, experiment with different color values.

The four hues you choose affect everything that's printed on the screen, including custom characters. Although the program works with standard high-resolution mode, it's not compatible with multicolor mode.

Printing to the screen with Shades is the same as usual, except a few things which concern the way the display is created. Everything you print should be in reverse video; the characters will show up normally on the screen. To clear the screen, use SYS 49152 rather than CHR$(147), the regular clear-screen character. Finally, changing the cursor color or scrolling the screen disables the shading effect.

The second command, **SYS 49239,*c1,c2,c3,c4***, changes character colors without clearing the screen. This command makes possible a screen fade-on/fade-off effect. If the characters are the same color as the background, you can use this SYS call to add color to characters a section at a time so that text appears to materialize onto the screen. Similarly, the screen appears to dissolve if you set the color of each character to the background color with successive calls.

Finally, the third and last command—**SYS 49275**—turns Shades off.

How It Works

To see how Shades operates, clear a shaded screen and print some inverse and some normal characters. Shades takes advantage of the fact that inverse characters display the background color through their blank sections.

When a raster interrupt is used, the background color is altered four times for each row of the screen. Next, the screen is filled with inverse spaces to hide the background colors. When inverse characters are printed, the multicolored background shows through, making the characters appear shaded. So, characters with Shades are really templates over the background.

See program listing on page 82. **G**

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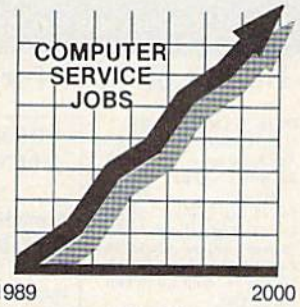
1. Choose training that's right for today's good jobs



Jobs for computer service technicians will almost double in the next 10 years, according to the latest Department of Labor projections. For you, that means unlimited opportunities for advancement, a new career, or even a computer service business of your own.

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2. Go beyond "book learning" to get true hands-on experience

NRI knows you learn better by doing. So NRI training works overtime to give you that invaluable practical experience. You first read about the subject, studying diagrams, schematics, and photos that make the subject even clearer. Then you do. You build, examine, remove, test, repair, replace. You discover for yourself the feel of the real thing, the confidence gained only with experience.

3. Get inside a powerful computer system

If you really want to get ahead in computer service, you have to get inside a state-of-the-art computer system. That's why NRI includes the powerful new Packard Bell VX88 computer as the centerpiece of your hands-on training.

As you build this fully IBM PC XT-compatible micro from the keyboard up, performing key tests and demonstrations at each stage of assembly, you actually see for yourself how every section of your computer works.

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You go on to install a powerful 20 megabyte hard disk drive—today's most-wanted computer peripheral—included in your training to dramatically increase the data storage capacity of your computer while giving you lightning-quick data access

By getting inside this powerful computer, you get the confidence-building, real-world experience you need to work with, troubleshoot, and service today's most widely used computer systems.

4. Make sure you've always got someone to turn to for help

Throughout your NRI training, you've got the full support of your personal NRI instructor and the entire NRI technical staff. Always ready to answer your questions and help you if you should hit a snag, your instructors will make you feel as if you're in a classroom of one, giving you as much time and personal attention as you need.

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SUPER SLIDESHOW

With "super slideshow," you can really show off the graphics capabilities of your 64 or 128. Display both hi-res and multicolor files in 13 popular formats. Disk drive required.

Steve Emsley

Slide-show programs offer a nice way to show off your collection of pictures, but most programs of this kind display picture files stored in only one particular format. If you have pictures you've downloaded from a bulletin board or if you use several different graphics programs, you'll find this kind of program to be very limiting.

"Super Slideshow" can display almost any graphics screen created on a Commodore 64 or 128. It displays pictures stored in over a dozen formats, including such popular formats as *Doodle*, *The Print Shop*, and Koala. Even though Super Slideshow runs on the 64, it can display pictures created on the 128.

Typing It In

Super Slideshow consists of three programs: Program 1, "Slideshow Creator," Program 2, "Slideshow Player," and Program 3, "Slideshow ML." Programs 1 and 2 are written in BASIC and should be entered using "The Automatic Proofreader," found elsewhere in this issue. Be sure to save copies of both programs.

Program 3 is written entirely in machine language. It must be entered using "MLX," the machine language entry program. When MLX prompts you, respond with the values given below.

Starting address: C000
Ending address: C28F

Once you've typed in the whole program, save a copy to disk with the name SS.ML. Program 3 must be saved on the disk with Program 2.

Before you begin building a slide show, you need to decide what pictures you want to include. Copy these picture files to a blank formatted disk; the order isn't important. Be sure to note which drawing program was used to generate each of the pictures. A graphics file requires approximately 35–40 blocks of disk space to store, so you can put 15–20 pictures on a disk. Remember to leave room on the disk for Super Slideshow's display program, machine language routine, and slide-show script—about 13 disk blocks for all three.

Creating a Script

Run Program 1, Slideshow Creator. The main menu appears on the screen with the following choices:

1. CREATE SLIDESHOW
2. EDIT SLIDESHOW
3. SAVE SLIDESHOW
4. LOAD SLIDESHOW
5. QUIT

Since this is your first session, select option 1, Create Slideshow. The

program prompts you for the number of pictures in the slide show. Your slide show must contain at least one picture, and it may contain as many as will fit on the disk. Next, the program asks how long (in seconds) to display each picture. Enter a value between 1 and 59. If you enter a number outside this range, the default value, 10, will be used.

Next, the program prompts you for the name of the picture file, the graphics format, and the message to display while the picture loads. When entering the name of the graphics file, don't include any extensions added by the drawing program. For example, don't include the *DD* added by *Doodle* or the *PI.* added by *Blazing Paddles.* Type the name as it would appear from within the drawing program.

Super Slideshow supports the following graphics formats: Koala, *Create with Garfield, Doodle, The Print Shop, Paint Now!, Art Studio, Advanced Art Studio, Rainbow Painter, Paintbrush, Vidcom, Artist 64, Blazing Paddles,* and lo res (character graphics). When the program asks you to choose a graphics format, press the corresponding letter key. If the paint program you're using isn't in this list, try several different formats. You may be able to use one of these formats to display your pictures.

All formats supported by Super Slideshow, except lo res, are either high resolution or multicolor bitmap formats. Lo res is a format used by several paint programs (including *Deluxe Paint II, Screen Gem,* and *Grafix Magic* 4.0) to store ordinary text screens.

The last bit of information the program asks for is the message to display while the graphics file loads. This message can be up to 40 characters long and can contain any characters except the comma or colon. You can enter messages up to 80 characters long, but those longer than 40 characters won't be centered on the screen correctly.

When you finish entering data, the program returns you to the main menu.

Other Options

Once you've entered your slideshow script, you need to save it to disk. (You must save your slide show so that Slideshow Player can execute it.) Select the Save Slideshow option from the menu. The program asks for a filename, saves the data, and then returns to the main menu.

Once your script is saved to disk, you can use Program 2, Slideshow Player, to view your handiwork. If you discover a mistake in your slide show, don't worry. Slideshow Creator also has Load and Edit options.

To modify a slide-show script, select Load Slideshow from the main menu and enter the filename of the script file. Next, select Edit Slideshow from the main menu.

The Edit option displays the information for each picture in the slide show. You can change the picture name, format, or message; go to the next picture; or return to the main menu. After you've edited the information for all the pictures, you can change how long each picture is displayed. Be sure to save your updated script before leaving the program. (Note that Slideshow Creator can overwrite older versions of your script file, so you need not save it with a different name.)

Watch the Show

After you have copied your picture files and written your script, you're ready to watch the slide show. Be sure that Programs 2 and 3, your script, and your picture files are all on the same disk; then load Slideshow Player and type RUN.

Slideshow Player loads Program 3 and then prompts you for the name of your script file. Enter the name of the file and press RETURN. The script file is loaded, and the show begins.

For each picture in the script, the program displays the message while it loads the picture file. The picture is displayed for the amount of time you've selected, and then the next one is loaded. You can force Slideshow Player to begin loading the next picture by pressing any key other than Q while a picture is on the screen.

Slideshow Player displays each picture in the script and then loops back to the beginning again. You can quit by pressing Q while a picture is being displayed. The program returns to the script filename prompt. Press just RETURN to go back to BASIC.

See program listings on page 83. **G**

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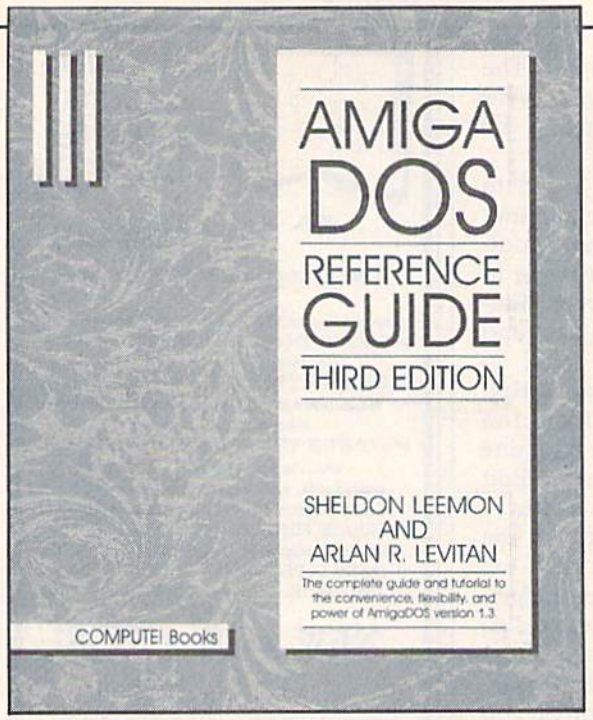

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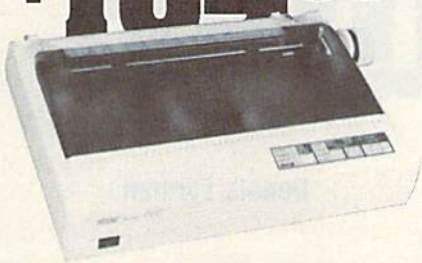

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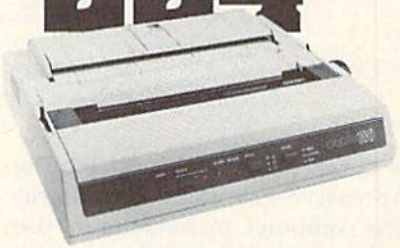

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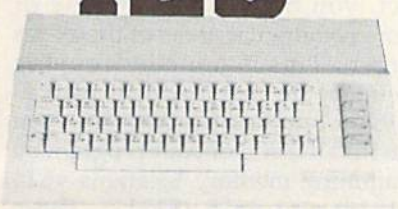

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Dissolve 128

Dennis Furman

Hi-res graphics "dissolve" into and out of view with this machine language program for the 128.

It's always intriguing to watch the impressive graphics demonstrations computer manufacturers use to show off their products. As a hobbyist, I often try to duplicate some of their feats on my Commodore 128. Although it's hard to match the dazzling displays of machines like the Amiga, it's still possible to squeeze some impressive results out of the old VIC chip. One of my favorite effects is the *dissolve*, where a rectangular area of the screen appears or disappears in a series of random dots.

"Dissolve 128" is a graphics utility that displays or removes a previously saved hi-res or multicolor area of the screen. Using a random-number generator and a special bit-masking routine, it can save and restore rectangular areas in a spectacular dissolve effect.

Getting Started

Dissolve 128 is a machine language program written in the form of a BASIC loader. It's listed here as Program 1. Program 2 is a BASIC demo program that uses Dissolve 128. Use "The Automatic Proofreader," found elsewhere in this issue, to type in both programs. Be sure to save a copy of each program to disk when you've finished typing.

When you run Program 1, it POKEs Dissolve 128's machine language (ML) routines into free RAM at 4864 ($1300). It then asks for the width and height, in characters, of the rectangular area of the screen to be dissolved. The width and height values are entered as columns and rows, respectively. Columns can be in the range 1–31 and rows can be in the range 1–25. Although a 31 × 25 area is possible, the visual effect is better for smaller areas such as 10 × 4 or 8 × 6. For Program 2, enter 8 for the columns value and 6 for the rows value. Once you've entered the area's width and height, the ML routines are saved to disk as DISSOLVE.OBJ.

To use Dissolve 128 in your own programs, you must BLOAD the ML routines from disk using the command BLOAD "DISSOLVE .OBJ",B0,P4864. Disolve 128's routines are self-modifying, so don't attempt to relocate them.

After you've BLOADed Dissolve 128's ML file from disk, it's possible to change the area size set earlier by the BASIC loader. To change the height, use the command POKE 5036,*height*. Use the command POKE 5025,8**width* to change the area's width.

Saving a Rectangle

Before you can use the dissolve effect, you must first save one or more rectangular areas of the hi-res screen. This is done by copying them to the free RAM in bank 0 above your BASIC program. You can find the end of your program by examining memory locations 4624 ($1210) and 4625 ($1211). These addresses form a pointer to the end of your program. Memory above this is used for data storage.

Rectangles are saved to areas of memory called *pages*. A page is a 256-byte section of memory beginning at a memory address evenly divisible by 256. For example, page 0 consists of memory locations 0 to 255. Page 1 includes memory locations 256 to 511. To find the first available free page, use the formula **AP=PEEK(4625)+1**.

If you save more than one rectangle, be sure to allow enough room between starting points. For example, an 8 × 6 rectangular area (the size used in Program 2) needs 8 rows × 6 columns × 8 bits per byte, or 384 bytes (about 1½ pages). The remaining half-page cannot be used for saving rectan-

gles, so the next rectangle must be stored beginning at page AP + 2.

The command that saves a rectangular area of the screen is

```
SYS 5290,page,column,row
```

where *page* is the address where the rectangle is saved and *column,row* are the coordinates of the upper left corner of the rectangle to be saved.

As an example, let's say you want to save a rectangular area at row 11, column 19. The following program does this for you:

```
10 BLOAD "DISSOLVE.OBJ",B0,P4864
20 COLOR 0,2:COLOR 1,7:COLOR 4,2
30 GRAPHIC 1,1:GRAPHIC 0
40 AP=PEEK(4625)+1
50 REM DRAW GRAPHICS
60 SYS 5290,AP,19,11:REM SAVE
   RECTANGLE
```

This example begins by loading the ML program. Line 20 sets the background, border, and text colors. Line 30 selects and clears the hi-res screen and then returns to text mode. Line 40 determines the location of the first available free page (where the rectangle should be saved). Line 50 contains your graphics-drawing commands. Finally, line 60 calls the ML routine that saves the rectangle to memory.

Dissolving Graphics

To restore a previously stored rectangle, use

```
SYS 4864,page,column,row,1
```

where *page* is the address of the saved rectangle and the values for *column,row* specify the upper left corner of the screen at which the rectangle is restored.

The rectangle materializes, combining with whatever graphics appear on screen.

Dissolve 128 can also remove rectangular areas of the screen. The command

```
SYS 4864,page,column,row,0
```

dissolves everything from the screen *except* the rectangle defined by *page*. If you want to remove everything within a rectangular area, the data stored at *page* should consist of all zeros. Program 2, the demonstration program accompanying this article, shows how to do this.

One additional command is available with Dissolve 128:

```
SYS 5338,,column,row
```

removes a section of the screen, with no dissolving.

See program listings on page 80. **G**

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feedback

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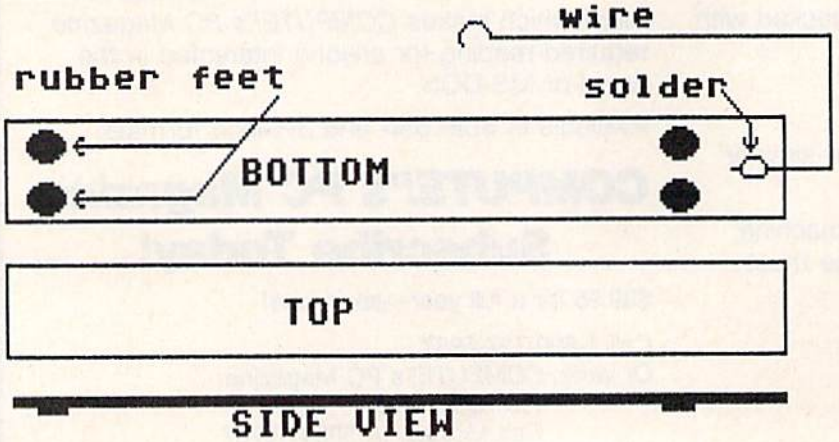
A Ground Strip

Regarding Robert Nedreski's letter in last month's column concerning static charge: I have experienced similar problems. Mr. Nedreski suggested using a grounded wrist strap from Radio Shack. After having to replace a CIA chip in my Commodore 128 that was damaged by static electricity, I built the antistatic touch strip (see accompanying figure). The materials and tools required for the job are also listed.

Once you've assembled the strip, you can ground it by connecting the wire lead to the center screw of a grounded electrical outlet. While this is not fail-safe, if you touch the strip before handling any part of the computer—including the joysticks—you will eliminate most, if not all, static electricity problems.

Antistatic Touch Strip



Materials and tools needed:

1. Cadmium-plated strap iron (1¼ × 12 × ⅛ inch)
2. Copper wire (3 feet)
3. Solder
4. Rubber feet (4)
5. Soldering iron
6. Screwdriver

Mark Pettigrew
Carson City, NV

Your touch strip is a convenient alternative to the grounded wrist strap from Radio Shack. Thank you for this contribution.

Readers: If you aren't handy with tools, you may not want to undertake this project. Also, before you connect the strip wire to the center screw of an electrical outlet, be sure to turn off the power to the outlet so you don't get shocked.

MLX Confusion

Ever since I started buying your magazine, I've had trouble entering programs using MLX. I haven't had any trouble using the Proofreader, but I can't get MLX to work. Typing, saving, and loading seem to work correctly, but when I run a program from MLX, it won't start. What should I do?

Jay Dvora
Chatsworth, CA

"The Automatic Proofreader" and "MLX" are two utilities designed to help you catch typing errors when you enter our program listings. The Automatic Proofreader is used to type in BASIC programs; MLX is used to enter machine language (ML) programs.

When we publish an ML program, we explain in the article that you need to use MLX to enter the program data, and we give you the information required by MLX. In addition, we also provide any special instructions that you might need to enter that program. What we don't tell you is how to use MLX itself; the article that accompanies MLX does that.

Since you're having trouble putting all these instructions together, here is a step-by-step explanation of how to type in a machine language program:

- *If you don't already have MLX, you must type it in using The Automatic Proofreader. The MLX article contains more information on how to do this.*
- *Load MLX; then run it. As before, the MLX article explains this step in more detail.*
- *MLX prompts you for the starting and ending addresses of the program you are entering. You will find these values in the article that accompanies the program. Next, MLX asks if you wish to clear the workspace. Press Y (for yes) if you're starting to type in a new program; otherwise press N (for no).*
- *Next, MLX displays its main menu. If you're starting a new file, go to the next step. If you're continuing a program that you started in a previous session, you must reload the file before you continue to enter data. Use the load command from the menu to load your file.*
- *You're now ready to enter data. When you select Enter Data from the menu, MLX asks for the address where you want to start entering data.*

If you're beginning a new file, enter the starting address for the program. If you're continuing from where you left off, enter the number of the line following the last line you entered. If you didn't write down the line number where you stopped, you should be able to find it using the Display option from the menu. Display asks for the address from which to start displaying data. Enter the number of one of the lines from the magazine listing that you know you've entered. The lines following your data will contain only 0s. The first line of 0s is where you need to start entering data.

- When you've finished entering the program or have decided to stop for a break, you need to save the data you've entered. Select the Save option from the menu. MLX prompts you for a filename. This filename must be unique; there must not be another file on the disk with the same filename. Enter the filename and press RETURN. If MLX has trouble saving the file, it displays an error message. If you get a FILE EXISTS error, try to save the file again, this time using a different filename. If you get some other error, your disk may be bad or it may be full. In either case, place another formatted disk into the disk drive and try to save the file again. If you don't save your file successfully before you leave MLX, your data will be lost.
- Exit from MLX using the Quit menu option. If you haven't finished typing the program, you'll have to repeat these steps until you finish. If you're entering a long program, it may take several sessions to complete the program.
- Once you've finished entering your program, you've finished with MLX, so put it aside. Then, simply follow the instructions for using the program in the article that accompanies it.

Several readers have had problems entering programs in multiple sessions. MLX saves the entire workspace each time you save your data. If you forget to load the file from your previous session before resuming data entry, you won't be able to combine the files. Also, once you've saved a new copy of your program, the old copies are obsolete. The new file contains all the data in the previous files plus the data you just entered. You may want to keep the old files as backups, but they aren't necessary.

For more information on how to type in programs using MLX, read the article that accompanies MLX in this issue.

Where Is *Turbo Pascal?*

In the November 1987 "Horizons" column, you mentioned that *Turbo Pascal* was available for the CP/M mode on the Commodore 128. I haven't been able to find it. Also, when the Amiga was introduced in 1985, I remember seeing ads for an Amiga version of *Turbo Pascal*. Is there one?

Awais Zaka
Lahore, Pakistan

Borland has stopped selling the CP/M version of Turbo Pascal. An alternative is Super Pascal 128, from Abacus. This package runs in 128 mode and includes the editor, compiler, and runtime package. It sells for $59.95. There is a separate Commodore 64 version at the same price. For more information, contact Abacus, 5370 52nd Street SE, Grand Rapids, Michigan 49508.

The Amiga version of Turbo Pascal was advertised but never shipped. Metacomco makes MCC Pascal, which costs $99.95. To find out more about Pascal for the Amiga, write Metacomco, 5353E Scotts Valley Drive, Scotts Valley, California 95066. A descendant of Pascal known as Modula-2 is also available for the Amiga. There are versions available from several companies.

Loading Sequential Files into *SpeedScript*

I recently saved a letter to disk from *SpeedScript* 3.2 on my Commodore 64 using the SHIFT-CTRL-P option. Later, when I attempted to reload it, I got a file type mismatch error. Can you help me?

David L. Holt
Mechanicsville, VA

Ordinarily, when saving a SpeedScript document to disk, you press f8. This causes the text of the document to be saved as a series of screen codes in a program file (PRG type on disk). Saving with the SHIFT-CTRL-P <D>isk option caused your letter to be "printed" to disk rather than being output to the printer. In this case, the information required to print your letter was sent to disk and stored as a sequential file (SEQ type). More than likely, this file is in Commodore ASCII form—the SpeedScript default. If you placed a formatted a at the beginning of your letter, the file was stored as true ASCII. Either way, when you attempt to reload it (using f7), you get a type mismatch error. This occurs because SpeedScript's load routine expects a PRG-type file but instead is finding a sequential file.

Now for the good news. You can recover the text of your letter from the file you have on disk. However, some doctoring will be necessary before your letter is fully restored. Since the file contains only the character codes that are sent to the printer, all formatting commands which normally show up in a SpeedScript file as reverse-video characters—for example, header or footer commands, text centering, line spacing, and so on—will be missing. In their place will be the character codes SpeedScript sends when it executes each formatting command. So, headers and footers will appear within the text, spaces will be added to center text (and for left margins), carriage returns will be included for double-spacing, and so on.

What you'll need to do to restore your letter is to strip out the characters that have been added to the file and reinsert the appropriate formatting commands they represent. Before you can do this though, you need to convert the letter from a sequential file to a program file (in SpeedScript format). To carry out this conversion, run the "SpeedScript File Converter" program published along with SpeedScript. When prompted for the type of conversion you wish to perform, choose option 3—the Commodore ASCII to SpeedScript conversion. (If your letter was written to disk as a true ASCII file, you'll first need to convert the file from true ASCII to Commodore ASCII.) Your letter will be rewritten to disk as a SpeedScript file with the filename you've specified. To load this file into SpeedScript, just follow the normal load procedure (press f7). Then delete the unwanted character codes, add the missing formatting commands, and save the file with f8. **G**

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THE programmer's page

Programming the 128

Randy Thompson

"The Programmer's Page" is interested in your programming tips and tricks. Send all submissions to The Programmer's Page, **COMPUTE!'s Gazette,** *P.O. Box 5406, Greensboro, North Carolina 27403. We'll pay $25–$50 for each tip we publish.*

Although I don't get as many programming tips for the 128 as I do for the 64, I know that there are a lot of 128 programmers out there. So this month I've put together a collection of hints, tips, and information geared exclusively toward Commodore's most powerful 8-bit computer. All of these tips were sent in by readers.

Where Am I?

If you're writing a program for the 128 and want to make it 64-compatible as well, it's useful to know under which mode the program is running. To accomplish this, simply PEEK memory location 65534 ($FFFE). This location holds the low-byte address of the computer's main interrupt routine. On a 128, this location contains a 23. On the 64, it contains a 72.

Robert G. Gingher
Massapequa, NY

Making the Switch

The January 1989 "Programmer's Page" contained a tip on switching between 40- and 80-column modes using a SYS 65375. Here are some more thoughts on the subject.

Another method of changing between 40 and 80 columns is to set the 40/80 key (located in the uppermost row of keys) and hit RUN/STOP–RESTORE.

To tell if the computer is in 40- or 80-column mode, PEEK memory location 215 ($D7). If this location contains a 0, you're in 40-column mode. The 80-column mode returns the value 128.

To detect which position the 128's 40/80 key is in (not necessarily the mode that the computer is in), PEEK location 54533 ($D505). If this location returns a value less than 128, the key is down and set to 80 columns. If location 54533 contains a value greater than 127, the key is up and set to 40 columns.

David Kapsos
Portsmouth, NH

128 POKEs

The following is a list of useful POKEs for the 128:

POKE	Function
POKE 249,128	Disable bell (CTRL-G)
POKE 249,0	Enable bell
POKE 247,128	Disable Commodore-SHIFT
POKE 247,0	Enable Commodore-SHIFT
POKE 241,C	Set cursor color (C = 0–15)
POKE 248,128	Disable screen scroll
POKE 248,0	Enable screen scroll
POKE 2594,127	No keys repeat
POKE 2594,1	Keys repeat as the 64's keys do
POKE 2594,128	All keys repeat (normal setting)
POKE 792,51:POKE 793,255	Disable RUN/STOP–RESTORE
POKE 792,64:POKE 793,250	Enable RUN/STOP–RESTORE
POKE 775,255	Disable LIST
POKE 775,81	Enable LIST

Lance Kinley
Mariposa, CA

Using MID$

Most of us use MID$ on the right side of an equation, as in A$=MID$(B$,3,1). On the 128, however, MID$ can also be used on the left side. For example, if A$ equaled "123456789" and B$ equaled "ABC", the instruction MID$(A$,4,1)=B$ would set A$ equal to "123A56789", while the instruction MID$(A$,4)=B$ would set A$ equal to "123ABC789".

Using this technique, you can stuff one character or a group of characters into the middle of another string without juggling LEFT$ and RIGHT$ funtions.

Michael Verdiguel
Lawton, OK

Autorunning Programs

Follow these steps to make your BASIC programs run automatically when loaded.

- Add the following line to the beginning of your program:

```
0 POKE 45,1:POKE 46,28
```

- With your program in memory, clear the screen, move to the top line, and enter these commands:

```
PRINT "{CLR}":POKE45,0:
POKE46,3:POKE770,153:
POKE771,175:PRINT "
{8 DOWN}":DSAVE"filename"
```

- Reboot your computer.

Now, when you enter the command

```
LOAD "filename",8,1
```

your program will automatically load and run. RUN/STOP–RESTORE will be disabled as well.

Anderson N. Cadell
South Lake Tahoe, CA

Noisy Listings

Here's a neat trick that makes the computer beep when you list certain BASIC lines:

- Enter a line that ends with a REM statement.
- Move the cursor directly after the REM and type two quotation marks.
- Press the DELETE key once to remove the second quotation mark.
- Press CTRL-9, SHIFT-M, G, and then RETURN.

Now, every time this line is listed, the computer will emit a beep.

John Morrison
Cookeville, TN **G**

April Release

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BASIC for beginners

E Doesn't Mean Error

Larry Cotton

If you've been using the metric conversion program presented over the last couple of months, you've noticed that some of the answers it gives look pretty strange. Instead of printing out very large and very small numbers with a bunch of zeros in them, it prints numbers with an *E*. Why?

Recall that there are three ways to store information in BASIC: as constants, as variables, and as arrays. Each of these, in turn, can hold three different types of information or data: integer, floating-point, or string. Since we've discussed these before, we'll concentrate only on floating-point constants.

Floating-Point Constants

Floating-point constants are numbers which can include fractional parts—indicated by a decimal point. Here are some examples:

```
1.24
.56
-4.78
-.999
1000.3
```

Note that the last one doesn't contain a comma. If you put commas in the middle of large numbers, BASIC will give you a syntax error.

Floating-point constants may be positive or negative. If the plus sign is omitted, the number is assumed to be positive. You may also have seen decimal numbers written as 0.56 or 3.2700. The zero prior to the decimal in the first number and those after the 7 in the second number are referred to as *leading* and *trailing zeros*, respectively. You may use them; they won't cause an error, but BASIC will ignore them—they waste memory and slow down your program.

Accuracy and Rounding

BASIC calculates to ten digits of accuracy but only displays the result to nine. Numbers longer than nine digits round to nine digits. When you write programs that deal with very large and very small numbers (such as the metric converter), rounding may become a factor in the accuracy of the results, especially if one answer is used as the basis for another problem. (See the August 1988 column for a discussion of rounding.)

You can express floating-point constants in either *simple-number notation* or *scientific notation*. The five previous examples are in simple-number notation. Let's now look at numbers that can be expressed in scientific notation. Another name for scientific notation is *exponential notation*—hence the abbreviation *E*. Type

```
PRINT .02
```

The computer dutifully prints .02. Now try

```
PRINT .002
```

The computer prints 2E−3. The 2, the *mantissa*, must be a positive or negative number between 1 and 10. The letter *E* shows the number is in scientific (exponential) notation, and the −3 is the signed exponent, which specifies the number of places you'd have to move the decimal point in order to express the number in simple-number notation. More on that later.

Now type

```
PRINT 999999999
```

The computer prints the number as you've entered it (assuming you have nine 9s). Type

```
PRINT 9999999999
```

That's ten 9s (1 less than 10 billion). The computer displays it as 1E+10; it has rounded your number to 10 billion.

So, BASIC uses *E* to express any numbers smaller than .01 or larger than 999999999. Note that the use of *E* is not a function of the number of decimals. Let's look at some examples using the metric converter.

We'll convert several quantities of meters to feet. Run the program and enter 22 (M TO FT) at the menu screen. At the prompt, enter 2. The answer that's displayed is 2 M = 6.56167979 FT.

Now run the program again and enter 22, then .2, at the prompt. The answer will be .656167979 (feet). If you entered .02, your answer would be .0656167979. So far, all problems and answers have been between the limits of .01 and 999999999. But if you enter .002 (a number smaller than .01), BASIC expresses both the problem and the answer in scientific notation:

```
2E-03 M = 6.56167979E-03 FT
```

Notation Conversion

It's easy to convert simple-number notation to scientific—just use the computer. Type

```
PRINT .002
```

The computer responds with

```
2E-03
```

But how does one mentally convert a number that the computer insists on printing with an *E* back to simple-number notation, which may be more easily understood?

If the *E* is followed by a *negative* sign, mentally move the decimal to the *left* the number of places indicated by the exponent. (The decimal is always assumed to be just to the right of the mantissa.) To convert the number 2E−03 to simple-number notation, mentally move the decimal three places to the left, add two 0s to fill in the gaps, drop the E−03, and you have it. Our "normal" number would be written

```
.002
```

Here's an example with a number larger than 999999999. Enter

```
PRINT 1231231233
```

The computer responds with

```
1.23123123E+09
```

Our number has lost a degree of accuracy from being rounded to nine digits (the final 3 was rounded down and dropped).

When an *E* is followed by a *positive* sign, mentally pick up the decimal and move it to the *right* the number of places indicated by the exponent. In the example above, the decimal moves to the right nine places. This creates a gap between the last 3 and the decimal point; the gap must be filled with a 0. The decimal point itself is dropped. Our "normal" number looks like, and would be written as,

1231231230 (or 1,231,231,230)

We know that numbers smaller than .01 or larger than 999999999 are expressed in scientific notation. But are there any limits to the numbers BASIC can handle? Yes. The largest is 1.70141183E+38 (over 170 trillion trillion trillion). Any numbers larger than this cause an overflow error. The smallest number that BASIC can handle is 2.93873588E−39. Calculations which result in a number smaller than this are shown as 0.

Calculating in Scientific Notation

We can even do BASIC mathematical calculations in scientific notation. Type

```
PRINT 2E5*3E6
```

Lacking a sign, the 5 and 6 are assumed to be positive. The computer responds with

```
6E+11
```

In multiplication problems, exponents are summed. However, the computer has a little problem with some other calculations:

```
PRINT 2E−5*3E−6
```

You'd expect an answer of 6E−11, but the computer responds with

```
6.00000001E−11
```

The reason is that, before BASIC performs any mathematical calculations, it first must translate the numbers we enter into a format the computer understands; then it must reformat the answers before printing them to the screen. In the translation process, some accuracy is lost. But don't worry—the discrepancy that's introduced is so slight it shouldn't affect the outcome.

Next month: Bugbusters!

bug-swatter

• Several readers have had trouble using "1581 Alphabetizer," from the February 1989 issue. Most of the complaints we've received mention scrambled directories and lost data. Let us repeat the warning from the Alphabetizer article: *Until you are sure that your copy of 1581 Alphabetizer is working correctly, use it only on unimportant disks.* If you make a mistake while entering Alphabetizer, it can scramble the directory of your disk, making the data on the disk inaccessible.

To our knowledge, there is only one problem with 1581 Alphabetizer. If your disk directory contains 296 entries (the maximum number possible on the 1581) and you try to move the last entry to a new position, the program will break with a BAD SUBSCRIPT ERROR. To correct this problem, change or add the following lines:

```
BE 890 SI$=Z$(K+O):IF(K+O)<296
       THEN FORA=K+O TO V-1:Z$
       (A)=Z$(A+1):NEXT
KK 1020 IF K+O<296 THEN FORA=V
       -1 TO K+OSTEP-1:Z$(A+1
       )=Z$(A):NEXT
PK 1025 Z$(K+O)=SI$:SI$="":RET
       URN
```

The following lines are enhancements to the 1581 Alphabetizer editor:

```
QR 30 PRINT"{N}";:DIMZ$(296):V
      =0:B=1:Q$=CHR$(34)
SJ 770 PRINTQ$MID$(Z$(A+K-1),4
      ,16)Q$:NEXT
FA 780 PRINT"{HOME}{YEL}"+LEFT
      $("{23 DOWN}",O)+"{RED}
      "Q$MID$(Z$(K+O),4,16)Q$
      ;
XX 815 IFA$="{HOME}"THENK=1:O=
      0:GOTO750
QM 820 IF A$="{DOWN}" THENGOSU
      B1030:O=O+1:IF O>=JJ TH
      EN O=0
RA 830 IF A$="{UP}" THENGOSUB1
      030:O=O-1:IF O<0 THEN O
      =JJ-1
JX 860 GOTO780
BE 890 SI$=Z$(K+O):IF(K+O)<296
       THEN FORA=K+O TO V-1:Z$
       (A)=Z$(A+1):NEXT
EG 930 PRINTQ$MID$(Z$(A+K-1),4
      ,16)Q$:NEXT
HB 940 PRINT"{HOME}"+LEFT$("
       {23 DOWN}",O)+"{RVS}
       {RED}"Q$MID$(Z$(K+O),4,
       16)Q$"{OFF}";
JJ 975 IF A$="{HOME}" THEN K=1
       :O=0:GOTO910
AE 980 IF A$="{DOWN}" THEN GOS
       UB1030:O=O+1:IF O>=JJ T
       HEN O=0
MR 990 IF A$="{UP}" THEN GOSUB
       1030:O=O-1:IF O<0 THEN
       {SPACE}O=JJ-1
DS 1010 GOTO940
JB 1030 PRINT"{HOME}"+LEFT$("
        {23 DOWN}",O)+"{YEL}"Q
        $MID$(Z$(K+O),4,16)Q$;
```

With these changes, the cursor will wrap from the top of the screen to the bottom and vice versa. Also, the HOME key now takes you to the top of the list. Thanks to reader Ed Durmont for these modifications.

• Several of our readers have had trouble using "Monthly Calendar," from the March 1989 issue. We have tested it thoroughly on a number of popular printers (see "Letters to the Editor" in this issue) and found the program to be sound. The problems some readers are having may be the result of typing errors when entering the program or simply an incompatibility between the program and certain printer or printer/interface combinations. **G**

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power BASIC

Quick Print

Chuck Webb

Need to print a short memo without affecting the program in memory? "Quick Print" does it with ease. For the Commodore 64, 128, Plus/4, and 16. Commodore-compatible printer required.

If you're like most programmers, you've probably found yourself wanting to print out something while in the middle of a programming session. Maybe you've wanted to record a few comments on the current program or perhaps dash off a quick note while you're thinking of it. You could, of course, handle this with a word processor, but you'd have to interrupt the program you were working on to run it. Besides, using a full-blown word processor might be overkill. What you really need is "Quick Print."

Quick Print is a machine language program that lets you output notes to the printer without disturbing the program in memory. It's great for simple typing tasks such as addressing envelopes or making labels. Plus, Quick Print works with many programs, including "Meta-BASIC" and the DOS Wedge.

Getting Started

Quick Print is written as a BASIC loader. Carefully type it in and save a copy. To avoid typing errors while entering the program, use "The Automatic Proofreader," found elsewhere in this issue. If you plan to use the program on a 128, be sure to type it in from 128 mode.

To install Quick Print, load it and type RUN. After Quick Print is installed, it displays its starting address. When you're ready to print a note, just SYS to the address that's shown on the screen. Quick Print clears the screen and waits for input. Enter a message that's no more than one *logical line* in length (up to 80 characters on the 64; up to 160 characters on the 128, Plus/4, and 16). Use any of the standard Commodore characters, including graphics characters. When you're ready to print your entry, just press RETURN over the line.

Quick Print's entry routine is similar to BASIC's INPUT statement. Because of this, the rules for keyboard entry with Quick Print—and editing the entry—are similar to those for INPUT. For instance, to replace an errant character, just cursor to it and type the correct character. You can also use the INST/DEL key to delete or insert characters within the entry field.

Quick Print won't prevent you from entering more characters than the program can print. Should your message exceed a logical line, Quick Print starts over, accepting new input on the following line. If this occurs, you can avoid having to retype the entry by moving the cursor back up to the original entry line and pressing RETURN.

After printing, Quick Print positions the cursor on the next screen line and waits for more input. At this point, you can enter another line or exit the program. To exit, just type an *x* and press RETURN.

Print a Letter

Once you've spent a little time with Quick Print, try printing a short letter. On the 64, Quick Print's entry field contains the same number of characters as a standard line of printed text (80), so it's easy to visualize how your input will appear before you print it. On the 128, Plus/4, and 16, the entry field is twice as long (160 characters), so you can actually output two printed lines at a time.

One more thing to remember: Do not use the cursor-right key to generate spaces; use the space bar instead. Spaces entered with cursor-right aren't always printed.

See program listings on page 78. **G**

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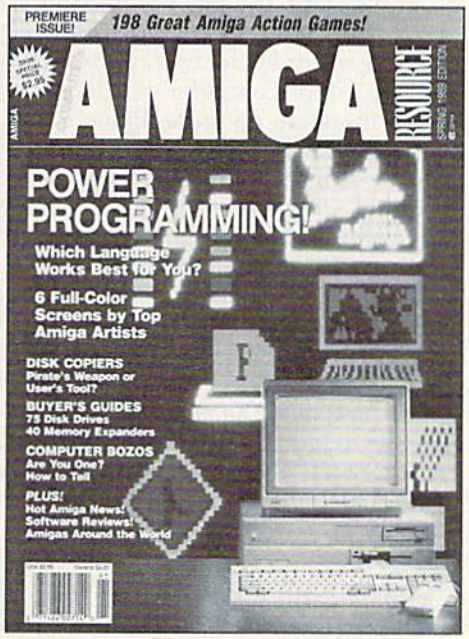

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machine language programming

Simple Stack Stuff

Jim Butterfield

The stack takes care of itself—most of the time. When a subroutine is called, the return address goes onto the stack but comes back off when the subroutine returns. The same is true of interrupt handling: What goes in comes right back out. Because of this, many programmers don't know much about the stack. In fact, many avoid it, believing it to be quite complex.

Not so. The stack is very simple. You seldom need to use it directly. But if you do, here's the important thing to remember: Leave the stack as clean as you found it. Be sure you take out anything you've put in.

Last In, First Out

At first glance, the stack seems to be the ideal place to stash a value for a moment. Want to print something and need the accumulator? Fine—push its value on the stack, do your work, and then pull the original value back off. Just be sure you don't make any clever decisions in the process that leave something permanently on the stack.

Since the first thing you pull from the stack is the last thing you've pushed, you could use the stack to reverse the order of data bytes. We'll give a simple example of this by means of a novel number converter.

The most efficient binary-to-ASCII routine (needed to prepare a value for printing) uses decimal mode. Other methods extract the highest digit, then the next highest, on down to the lowest digit of the number. We'll reverse this and extract the lowest-order digit first.

Our algorithm works by using remainders. If we have a number such as 345, we divide by 10, giving a quotient of 34 and a remainder of 5. The 5 is our last digit, so we put it on the stack. Next, divide the 34 by 10, yielding 3 and a remainder of 4. Put the 4 on the stack. Do the division again for a quotient of 0 and a remainder of 3. Put the 3 on the stack. Now we notice that the quotient is 0, so we pull the numbers from the stack and get 3, 4, 5—the digits of value 345. Note that there's no need to worry about leading 0s; the computer will detect when there are no more digits.

We'll divide by 10 using a compact version of the visible division program discussed last month in this column. We'll locate our program at 8192 ($2000), an area available on both the 64 and the 128. Let's look at the code.

We don't know how many digits will be generated. So let's push something onto the stack that we'll be able to identify as an end signal. A binary 0 is popular, but we'll use a RETURN character (CHR$(13)).

```
2000  LDA  #$0D
2002  PHA
```

The calling program POKEs the 16-bit binary value representing the dividend into addresses $2038 and $2037 (high byte, then low byte, respectively). We're dividing by 10, so we need a single-byte remainder area. This we set to 0. The program will loop back here if it needs to do another division.

```
2003  LDX  #$10  (16 bits to shift)
2005  LDA  #$00  (0 in . . .)
2007  CLC
2008  STA  $2036 (. . . remainder area)
```

The bits shift over to the left here, with some bits from the dividend moving into the remainder area. The program comes back here to move the bits over again; this loop repeats 16 times. If the carry is clear at this point, the new low-order bit will be a 0.

```
200B  ROL  $2038
200E  ROL  $2037
2011  ROL  $2036
```

We count down the number of bits by using the X register.

```
2014  DEX  (16 bits shifted?)
2015  BMI  $2022
```

Now we examine the remainder area to see if it contains a value of 10 or more. If it doesn't, the carry will be clear when we loop again. If it is 10 or higher, we subtract 10 and leave the carry set. This causes a 1 bit to shift into the low order of the dividend area.

```
2017  LDA  $2036
201A  CMP  #$0A
201C  BCC  $200B
201E  SBC  #$0A
2020  BCS  $2008
```

We exit after we've shifted the entire original dividend (at $2037 and $2038) through into the remainder area (at $2036). At this point, the dividend area now holds the quotient of the division, with the remainder in $2036. This remainder is important since its value is the decimal digit we're going to print.

Because the digits come out in reverse order, we change each one to ASCII and put it on the stack:

```
2022  ORA  #$30
2024  PHA
```

The digit has been put away. Next, we need to test to see if the number (the quotient from the last division) is 0. If it's not, we go back for another digit.

```
2025  LDA  $2038
2028  ORA  $2037
202B  BNE  $2003
```

That was quick. All we need to do now is to pull the numbers from the stack and print them. We'll watch for the RETURN to signal when we've finished. In fact, any character whose ASCII value is less than hexadecimal 30 (character 0) will trigger the end of this program.

```
202D  PLA
202E  JSR  $FFD2
2031  CMP  #$30
2033  BCS  $202D
2035  RTS
```

For the BASIC listing of this program, see page 84.

G

horizons

64K—Not What It Used to Be

Rhett Anderson

When the Commodore 64 appeared, it brought great graphics, beautiful music, and best of all, RAM. The 64 bragged about its RAM in its ads and even in its name: 64K of it. In fact, you couldn't even buy a version of the machine with less RAM.

The 64's major competitors—the Apple II, the Atari 800, the Radio Shack TRS-80, and the TI-99/4—all came standard with less RAM. Even with all of its capabilities and its mother lode of RAM, the 64 sold for less money than any of its competitors. And that's how it won the war.

The New World Computer

By winning that war, the 64 set itself up to battle the increasingly powerful computers that followed. First came the IBM PC, initially equipped with as little as 64K and a tape drive. Memory on the PCs soon climbed, however, and today most PC systems are sold with at least 512K of RAM.

Next came the Macintosh. It was originally sold with 128K of RAM. Apple (and Mac owners) quickly found out that a Mac wasn't really a Mac until it had at least 512K of RAM.

Commodore's own power computer, the Amiga, was introduced with 256K. Most Amigas sold today have one megabyte of RAM.

The situation makes the 64's once-impressive 64K look pretty meager.

Deep Limits

So where's the one-meg 64? The machine to do battle with the current heavyweights? It's not coming from Commodore, that's for sure. The 64 is based upon a variant of the 6502, the microprocessor that dominated the 8-bit computers of yesterday (and today). A limitation of the 6502 (and most other 8-bit microprocessors) is that it can address only 65,536 bytes of memory. Any memory (RAM or ROM) beyond this magic number must be added by trickery.

The 64 has used some trickery even from the start. It hides part of its RAM "under" its BASIC and OS ROM. It takes clever programming to access this RAM. That's why BASIC 2.0 tells you that it has some 38K to work with, not 64K.

Even more trickery is done in Commodore's only real upgrade of the 64—the 128. The 128 employs a bizarre system of RAM banking to get 128K of RAM. The price of this trick is incompatibility with the 64. Thus, the 128 can run programs that use 128K of RAM, but only in its native mode. In 64 mode, the 128 has available the same amount of RAM that a 64 has.

Commodore's solution to the 64 RAM dilemma is its RAM expander, the 1764. The problem with the 1764 is that memory expansion on the 64 is neither contiguous nor automatically recognized by the system. Contrast this with the PC, the Mac, and the Amiga. The RAM added to these machines acts just like the RAM that the computer comes with.

Is there a way to make a computer that has plenty of RAM but is still compatible with the 64? Yes, there is a way. Apple's way.

Following Apple's Lead

Apple had the 64K problem with its Apple II line. Like Commodore, Apple had moved up to 128K via RAM banking. The Apple IIc and the Apple IIe are both sold with 128K. To move to greater amounts of RAM, Apple changed processors. The Apple IIGS uses the 65816, the upwardly compatible sibling of the 6502. This newest Apple II can access megabytes of memory, and it also features greatly improved graphics and sound.

Commodore could do the same thing with the 64. Imagine: a one-megabyte 64 with Amiga-style graphics and sound. Sound good? Before you say *yes*, let's look at the problems of the Apple IIGS.

The Apple IIGS spent a few years waiting around for software. While it waited, it could run existing Apple II software at about double-speed. Wow. Once the software did come, it generally left much to be desired when compared with Mac and Amiga software. Was the IIGS a total bust? Probably not. After all, it made Apple's Mac look like a bargain.

A souped-up 64 would likely share the same problems. It would be more expensive than an Amiga (at least at first), it would suffer from a severe software shortage (even the 128 has suffered from a lack of native software), and, worst of all for Commodore, the project would steal valuable time, energy, and money from Amiga development and marketing.

The 64 sells today because it is a great bargain. Commodore has no guarantee that a more expensive variation would sell.

Is 64K So Bad?

The 64 is pretty much stuck with 64K. That's fine. Programmers have been able to cram an astonishing amount of functionality into that space. Limited memory even has its advantages—imagine trying to load in a 400K program from three floppy disks with a 1541 drive!

Like it or not, the 64, once Commodore's high-end computer, is now its low-end computer. But who can complain when the 64 is more useful now than it was when it first arrived? **G**

d'iversions

The Howard Cosell of Computer Sportscasting

Fred D'Ignazio

One of the hottest new buzzwords in technology is *multimedia*. Multimedia means connecting your computer to other high-tech equipment, including video cameras, musical keyboards, videodiscs, CD-ROM players, LCD projectors, laser printers, and so on.

Use of multimedia can make dry subjects like prefixes and fractions come to life in the classroom. And it offers exciting possibilities for individuals to express their ideas in the form of music, movies, interactive animations, and other dramatic presentations.

But it's also expensive—very expensive. Setting up a multimedia workstation on an Amiga computer, for example, with all the bells and whistles, could cost from $10,000 to $15,000.

But what if you're the owner of a 64 or a 128? Do you have to wait another ten years for prices to drop, or is there something you can do now to get your feet wet in multimedia?

The TV Connection

You're in luck. As long as you keep your expectations under control, you have a lot of multimedia options using your 64 or 128.

To get started, you'll need these items: a Commodore 64, 128, or 128-D; a 1541 or 1571 disk drive; a color TV or monitor; a VCR; and a picture cable linking your computer and monitor.

Unplug the picture cable from the computer monitor and plug it into the Video In jack on the back of your VCR. (Older VCRs might require an RF box if there is no Video In jack.)

If your VCR is hooked up to the TV, just turn on the VCR's power, press the VCR/TV button to set it to VCR, and select Line Input on the VCR's control panel (which may be inside a door on the front of the VCR). Your computer picture now appears on your television set!

Taping Your Favorite Game

Do you like recording important basketball and football games on videotape? Now, using the computer/TV connection, you can begin taping your favorite *computer* games!

First, load up your favorite game on your computer. Put a blank videotape into your VCR and set it to Record. The VCR should indicate that it is recording, and the tape inside the VCR window should be turning. Begin playing your game.

After a minute or two, press Stop on the VCR; then press Play and hold down the Rewind button. You should see the last minute of the game rewind backward on the TV screen. Release the Rewind button and, voilà, you are now seeing a taped copy of your videogame. You have performed your first multimedia transformation—from computer disk to videotape.

Be a Computer Sportscaster

Have you ever wanted to sit high above the crowd in a TV sportscaster's booth at the Astrodome or the Orange Bowl and cover a big game for folks back home?

Now you can do it with your computer games. First you'll need the following supplies from your local Radio Shack:

- Dynamic Omni Microphone, catalog #33-1054, $4.99
- Audio Amplifier-Speaker, catalog #277-1008C, $11.95
- Dubbing Cable (RCA-to-RCA), catalog #15-1537, $6.95
- RCA-to-⅛-inch Adapter, catalog #274-378, $1.99

Plug the microphone into the Input jack on the amplifier, the adapter into the amplifier Output jack, and the dubbing cable into the adapter. Then take the dubbing cable and plug it into the Audio In jack on the back of your VCR.

The microphone has a stand so you can set it up on the table beside your computer. Start recording on your VCR, and begin playing your computer game. As you play, pretend you're a sportscaster and describe the action. Ham it up—you're on the air!

Computer MTV

You can add a soundtrack to your "broadcast" by unplugging your Radio Shack cable from the microphone and plugging it into your Walkman or boom box. The other end of the cable stays in the Audio In jack of the VCR. Now you are recording music or sound effects along with the computer images from your game directly onto videotape. With a little imagination, you can even make it look and sound like MTV.

You can spice up your video even more by purchasing a program like *Home Video Producer* for $29.95 from Epyx (600 Galveston Drive, Redwood City, California 94063). *Home Video Producer* lets you paint TV titles, credits, and special effects onto your video to give it a more professional look.

And how about live action? If you can find a video camera or camcorder, you can mix shots of the game with live shots of yourself in the sportscaster's booth calling the play-by-play.

Multimedia on a Shoestring

It may be a while before you get your hands on a CD-ROM drive or a laser printer, but that shouldn't stop you from playing around with multimedia. And, who knows, maybe some hot producer will take a peek at your videotape and sign you up as ESPN's first computer sportscaster. **G**

THE geos column

Close-Up: GEOS 128—Version 2.0

Robert Bixby

By the time you read this, Berkeley Softworks will have introduced its first new release of 1989, the long-awaited and much-anticipated GEOS 128 2.0. In the box you'll discover not only a faster, friendlier deskTop, but highly advanced versions of your old favorites *geoWrite* and *geoPaint*, a double handful of useful utilities like *geoMerge*, *geoSpell*, and *Text Grabber*, and much more.

The upgrade, for current GEOS 128 owners, costs $35.00, plus $4.50 shipping and handling. Even if you're a new GEOS 128 purchaser, the $69.95 suggested retail is about what you'd pay for any good 128 word processor—and you get a lot more than a word processor for the money.

On the deskTop

The deskTop has changed tremendously from previous versions. Berkeley has added several features to make computing under GEOS easier. Some of the new features are keyboard shortcuts, multiple-file copying, a digital clock, color-coded icons, and a virtual disk drive.

Keyboard shortcuts have been added for the most commonly used icons and menu options. For example, holding down the Commodore key and pressing the 1 key allows you to select the first file of the current directory page without moving your hand from the keyboard. You can also select all the files on the current page, all the files in the directory, or all the border files with menu selections.

A natural extension of the ability to select multiple files is the ability to copy multiple files. Use any of the methods noted above or hold down the Commodore key and click several file icons to move files in large groups. You can also hold down the Commodore key and mouse button to draw a rectangle around several files. All the files in the rectangle are selected.

The menu bar that runs along the top of the screen includes two new items, SELECT and PAGE. The SELECT menu provides options to select all the files on the current directory page, all the files on the disk, or all the files on the border area. The PAGE option allows you to insert a new directory page at any point among the other pages or to remove a page. Removing a page provides a speedy way to do away with as many as eight files very rapidly.

One of the most universally voiced complaints about GEOS 128 is that the printer icon is too near the trash-can icon. Too many people have absentmindedly dumped their printer files in the trash. With version 2.0, Berkeley has corrected this problem; the printer icon has been relocated to the left side of the bottom border. The designers have also made it possible to retrieve the last file deleted by clicking on the trash can.

GEOS 128 2.0 works with 1581, 1571, or 1541 drives in any combination and it makes extensive use of the RAM Expansion Unit (REU). A new feature of version 2.0 is its ability to use the REU as a virtual 1571 drive, drive C. Drive C is not an active drive (you can't open it or copy files to it), but you can rapidly swap it with drive A, making the REU drive A. As drive A, the virtual drive is available for use as if it were a mechanical drive.

geoWrite

geoWrite 2.1 is included in the new 128 package at no extra cost. Most GEOS users had a litany of complaints about the earlier *geoWrite* versions and bought *geoWrite* 2.0 as soon as it appeared on the shelf. Version 2.0 (for the 40-column screen) performed flawlessly, providing paragraph formatting, tabs, justification, and a host of other valuable features. The only problem was its speed (or lack thereof).

Therefore, the acid test of *geoWrite* 2.1 was whether it would be able to keep up with me as I typed. I'm not a particularly fast typist, but previous releases of *geoWrite* proved to be real slugs when my fingers went into overdrive.

To test *geoWrite*'s latest incarnation, I typed repeatedly, *Can the word processor of my dreams keep up with my nimble fingers?* (Sometimes it looked more like *Cab the wor dprocesro fo my drea,s kep u@ with my nimber fongels?*—but that wasn't *geoWrite*'s fault). The answer is a qualified *yes*. Qualified only because it slowed down somewhat when several special styles were imposed on the type (bold, italic, outline, underline, and superscript). Type that was plain or had only one or two styles (like bold or underline) seemed to be displayed instantaneously. I never left *geoWrite* 2.1 in my dust.

Part of the improvement in speed is due to the fact that *geoWrite* 2.1 works exclusively on the 80-column screen. This provision allows the entire eight-inch page width to be displayed at all times. Since *geoWrite* doesn't have to shift the screen horizontally, it can spend more time on other activities. Another benefit of using the 80-column screen is that the CPU (Central Processing Unit) can run at high speed (2 megahertz instead of 1). More speed means that *geoWrite* now handles transitions like vertical screen scrolls much more quickly.

geoPaint

geoPaint allows you to work in either 40- or 80-column mode (color isn't available in 80-column

mode). For my money, nothing can match the crisp, clear graphics available in 80-column mode, despite the inevitable problems with the aspect ratio. (Packing 640 pixels in the width normally taken up by 320 requires that you paint like El Greco—everything looks tall and thin. When you print out your masterpiece, be prepared for it to print out like a Botticelli—round and bumptious and maybe a little on the tubby side.) Fortunately, the preview screen (accessible from the FILE menu) offers a very accurate portrayal of what the graphic will look like on paper.

write your number down on a lot of little pieces of paper and give them to people and they might call you. But by the time I wrote your name on these little pieces of paper, all the people were gone. And the church was dark. I was hungry and went to look for a McDonald's. One thing about McDonald's. No matter how lost you are, you can find one."

truck stops and mill workers' homes, was as strange to them as to his father.

"I stopped in one little town and no one could tell me how to get to Greensboro. Or what I mean is that everybody had a theory, but you could tell that no one really knew. So finally I went to the state police post and the sergeant told me how to get here.

Version 2.0 allows printing at 60 percent of normal size, a nice alternative to the jagged character problem.

geoPaint has a mass of new features, including constraint (limiting a line to 45-degree–angle increments); the ability to draw ellipses or perfect circles; and pasting text scraps transparently, opaquely, and in patterns. A dozen other powerful enhancements make *geoPaint* much faster and easier to use.

Printer Drivers

In addition to the broadest collection of printer drivers I've ever seen (including a new parallel interface option for the Hewlett-Packard LaserJet and support for six color printers), version 2.0 comes with an interesting array of special printer drivers capable of printing double and quad density on some printers.

For some printers, 2.0 also offers printing at 60 percent of normal size. This option produces an extremely dense printout that effectively hides the "jaggies" in printed text (see figure).

Paint Drivers

The printout in the figure was created with another powerful print feature: paint drivers. Paint drivers are special printer drivers that allow you to print your documents to *geoPaint* documents. Two types of paint drivers are available: Paint PAGES and Paint OVERLAY. Use paint drivers as you would any other printer driver; select them using the Select Printer menu option. Once paint drivers are installed, they behave as if they were ordinary printers.

When Paint PAGES is selected as the printer, drag your document's icon to the printer icon and click as if you were printing it on a real printer. Paint PAGES goes through your manuscript, turning each page into a full-sized *geoPaint* document which can then be edited pixel by pixel with *geoPaint*.

Paint OVERLAY is similar to Paint PAGES, but it does something a little more complex. Its primary purpose is to allow you to print your *geoWrite* documents in multiple columns.

To use Paint OVERLAY, go through your *geoWrite* document, turning each individual page into a single column. Page 1 might have margins of ½ inch and 3¾ inches; page 2, margins of 4¼ and 7½ inches. Continue through the document, alternating on the left and the right side of the page. Now drag the document's icon to the printer icon. When the dialog box appears to ask how many pages to print, select pages 1 through 2. The program behaves exactly as if it were printing to your printer, but it constructs a file on disk instead. The resulting file is called OVERLAY. Rename OVERLAY to PAGE1 or something similar. (If you don't, the Paint OVERLAY driver continues writing text to the file.) Repeat the procedure again, but this time, print pages 3 through 4. Rename the OVERLAY file PAGE2. Continue until you've printed your entire document as *geoPaint* documents.

If you print a large file using Paint OVERLAY, you might run out of disk space. You may have to stop at some point and move your *geoPaint* files to another disk.

As far as I could determine, there is no limit to the number of columns you can overlay. You can overlay text on graphics or graphics on text, and you can superimpose files on top of files endlessly.

Other Utilities

Text Grabber made its initial appearance in the *Writer's Workshop* package. It allows for importing text files from a variety of other word processors to *geoWrite*. Text Grabber can convert *Fleet System 4*, *PaperClip*, *WordWriter 128*, and Commodore ASCII files to *geoWrite* files. As before, the conversion is strictly one-way; there is no provision for converting a *geoWrite* file back to another format (this would certainly have been a useful feature for programmers).

geoSpell, the spelling checker included with the 2.0 package, is fairly fast. I used it from the REU and from the 1581 disk drive with little disparity in speed. *geoSpell* reviews the text until it locates 590 unique words; then it checks each word against its own dictionary and a personal dictionary (which you can create as you go along). *geoSpell*, like *geoWrite* 2.1, works only in 80-column mode.

No Complaints, Please

Although I've concentrated here on the improvements in the most familiar GEOS utilities, there have been literally hundreds of minor improvements and additions that magazine space prohibits mentioning.

Suffice it to say that Berkeley has done it again. As good as GEOS 128 was, version 2.0 is enormously better. If you use GEOS 128, you should seriously consider the upgrade. If you are a 128 owner and haven't purchased GEOS 128, your wait has been rewarded. No one should complain that there isn't any good productivity software for the 128. **G**

Verbatim

Article on page 28.

```
GD 10 REM COPYRIGHT 1989 COMPU
      TE! PUBLICATIONS - ALL R
      IGHTS RESERVED
MJ 20 DIMWO$(400):X=RND(-TI)
HA 30 LX(3)=1:I=1:J=3
XF 40 IFJ=7THEN70
HG 50 READB$:IFB$="-1"THENMX(J
      )=I-1:J=J+1:LX(J)=I:GOTO
      40
QX 60 WO$(I)=B$:I=I+1:GOTO50
HH 70 A$="{RIGHT}{RVS}{BLU}
      {3 SPACES}{DOWN}{4 LEFT}
      {BLK} {BLU}{3 SPACES}
      {DOWN}{4 LEFT}{BLK}
      {BLU}{3 SPACES}{DOWN}
      {4 LEFT}{BLK}{3 SPACES}
      {3 UP}{2 RIGHT}"
BH 80 DN(1)=1:DN(2)=6:DN(3)=11
      :DN(4)=16:DN(5)=21
BD 90 AC(3)=24:SP(3)=4:SP(4)=4
      :SP(5)=3:SP(6)=3
MH 100 AC(4)=25:AC(5)=28:AC(6)
      =31:DO(1)=2:DO(2)=7:DO(
      3)=12:DO(4)=(17):DO(5)=
      22
CF 110 POKE53280,12:POKE53281,
      12:PRINTCHR$(14)CHR$(8)
      :TM=16:TU=1
PX 120 PRINT"{CLR}{BLK}
      {3 SPACES}COPYRIGHT 198
      9 COMPUTE! PUB., INC."
CS 130 PRINTTAB(11)"ALL RIGHTS
       RESERVED":PRINT"
      {2 DOWN}"
AF 140 PRINT"{4 SPACES}";:FORI
      =1TO8:PRINTA$"{LEFT}";:
      NEXT
CG 150 PRINT"{BLU}{10 RIGHT}
      {RVS}V{3 RIGHT}E
      {3 RIGHT}R{3 RIGHT}B
      {3 RIGHT}A{3 RIGHT}T
      {3 RIGHT}I{3 RIGHT}M
      {BLK}"
XH 160 E$="{P}{DOWN}{2 LEFT}
      {N}{RIGHT}{H}{DOWN}
      {2 LEFT}{Y}{UP}{LEFT}"
AP 170 N1=1:N2=2:PRINT"
      {5 DOWN}{5 SPACES}DO YO
      U WANT TO {UP}"E$"{RVS}
      1{RIGHT}{OFF}ENTER A WO
      RD"
CC 180 PRINT"{2 DOWN}
      {4 SPACES}OR {UP}"E$"
      {RVS}2{RIGHT}{OFF}HAVE
      {SPACE}THE 64 SELECT A
      {SPACE}WORD{2 SPACES}
      {UP}"E$"{RVS}{B}{LEFT}"
      ;
RB 190 GOSUB860:NP=NU
BJ 200 N1=3:N2=6
MG 210 PRINT"{2 DOWN}
      {2 SPACES}ENTER LENGTH
      {SPACE}OF WORD (3-6 LET
      TERS) {UP}"E$"{RVS}{B}
      {LEFT}";:GOSUB860:WL=NU
BS 220 PRINT:PRINT
PQ 230 IFNP=2THENXX=INT((MX(WL
      )-LX(WL)+1)*RND(1))+LX(
      WL):WD$=WO$(XX):GOTO270
FQ 240 PRINT"{6 SPACES}PLEASE
      {SPACE}ENTER A"WL"LETTE
      R WORD"
KE 250 INPUT"{23 SPACES}
      {17 LEFT}";WD$
AF 260 IFLEN(WD$)<>WLTHENPRINT
      "{3 UP}":GOTO240
GK 270 LM(3)=9:LM(4)=5:LM(5)=3
      :LM(6)=1
GH 280 FORI=1TOWL:AS$=MID$(WD$
      ,I,1):AS(I)=ASC(AS$):NE
      XT
MC 290 POKE53281,12:POKE53280,
      12
BD 300 PRINT"{CLR}";:FORI=1TO2
      4:PRINT"{RVS}{5}
      {39 SPACES}"
XP 310 NEXT:PRINT"{RVS}
      {39 SPACES}{HOME}";
RA 320 FORI=1063TO2023STEP40:P
      OKEI,160:POKEI+54272,12
      :NEXT
ME 330 PRINT"{RVS}{39 SPACES}
      {HOME}":POKE53281,1
EF 340 PRINT"{HOME}{DOWN}";:FO
      RZ=1TO4:FORJ=1TOLM(WL):
      PRINT"{RIGHT}";:NEXT
MA 350 FORI=1TOWL:PRINTA$;:NEX
      T:PRINT"{4 DOWN}":NEXT
GX 360 FORJ=1TOLM(WL):PRINT"
      {RIGHT}";:NEXT
ER 370 FORI=1TOWL:PRINTA$;:NEX
      T:PRINT"{HOME}"
FF 380 PRINTSPC(LM(WL)+2)"
      {DOWN}{RVS}{BLU}"CHR$(A
      S(1)+128)
BB 390 PRINT"{HOME}";:FORI=1TO
      DO(TU):PRINT"{DOWN}";:N
      EXT:PRINTSPC(AC(WL))"
      {RVS}{5}<"
QK 400 POKE198,0:PRINT"{HOME}
      {6 DOWN}"SPC(32)"{RVS}
      {5}YOUR{DOWN}{4 LEFT}
      {4 T}{DOWN}{4 LEFT}GUES
      S{DOWN}{5 LEFT}{5 T}"
EX 410 PRINTSPC(32)"{RVS}
      {6 SPACES}{6 LEFT}{RVS}
      {P}"
JM 420 PRINT"{2 DOWN}"SPC(32)"
      {RVS}TIMER{DOWN}
      {5 LEFT}{5 T}{DOWN}
      {4 LEFT}{RVS}{5}"INT(TM
      )
QM 430 PRINT"{HOME}{10 DOWN}"S
      PC(32);:FORI=1TOWL:GOSU
      B720:NEXT:PRINT"{RVS}
      {5} ":TM=16
PH 440 FORI=1TOWL:AR(I)=ASC(AR
      $(I)):NEXT
EG 450 LW=WL:FORI=1TOLW:C(I)=0
      :NEXT
GM 460 FORI=1TOLW:FL(I)=0:NEXT
ME 470 FORZ=1TOLW
EF 480 FORI=1TOLW:IFAS(I)=AR(I
      )THENC(I)=128+AR(I):FLA
      G(I)=1
KF 490 NEXTI
GX 500 FORI=1TOLW:IFAS(I)=AR(Z
      )ANDFLAG(I)=0THENC(Z)=A
      R(Z):FLAG(I)=2:GOTO520
CQ 510 C(X)=32
HG 520 NEXTI,Z
HG 530 PRINT"{HOME}";:FORI=1TO
      DN(TU):PRINT"{DOWN}";:N
      EXT
AD 540 PRINTSPC(LM(WL)+2)"
      {DOWN}{RVS}{BLU}";
RD 550 FORI=1TOWL
GP 560 IFC(I)>0THENPRINT"{RVS}
      "CHR$(C(I))"{OFF}";:GOT
      O580
DP 570 PRINT"{OFF}"CHR$(AR(I))
      ;
HH 580 PRINT"{4 RIGHT}";:NEXT
MC 590 CK=0:FORI=1TOWL:IFAR(I)
      =AS(I)THENCK=CK+1
BQ 600 NEXT:IFCK=WLTHEN640
CF 610 PRINT"{HOME}";:FORI=1TO
      DO(TU):PRINT"{DOWN}";:N
      EXT:PRINTSPC(AC(WL))"
      {RVS}{5} "
BM 620 TU=TU+1:IFTU=6THEN670
QS 630 GOTO390
SQ 640 FORZ=1TO15:FORI=1TO14:P
      OKE53280,I:NEXT:NEXT:PO
      KE53280,12
SM 650 GOSUB830
AB 660 PRINT"{HOME}{8 DOWN}"SP
      C(32)"{RVS}CORRECT
      {2 DOWN}":GOTO700
GQ 670 GOSUB830
KS 680 PRINT"{HOME}{6 DOWN}"SP
      C(32)"{RVS}OUT OF":PRIN
      T"{DOWN}"SPC(31)"{RVS}G
      UESSES!"
EA 690 PRINT"{2 DOWN}"SPC(32)"
      {RVS}ANSWER:":PRINTSPC(
      29)"{DOWN}{RVS}";:GOSUB
      840:PRINT"{DOWN}"
DH 700 PRINTSPC(32)"{DOWN}
      {RVS}PRESS A":PRINT SPC
      (34)"{RVS}{DOWN}KEY"
PF 710 POKE198,0:WAIT198,1:GET
      C$:GOTO110
DP 720 GETIJ$:IFIJ$<"A"ORIJ$>"
      Z"THEN740
RK 730 PRINT"{HOME}{10 DOWN}
      {RVS}{5}"SPC(31+I)CHR$(
      ASC(IJ$)+128)"{RVS}{P}
      {LEFT}";:AR$(I)=IJ$:RET
      URN
DP 740 TM=TM-.055
MR 750 PRINT"{HOME}{14 DOWN}"
BQ 760 IFINT(TM)<10THENPRINTSP
      C(33)"{RVS}"INT(TM)"
      {RVS}{LEFT}{2 SPACES}":
      GOTO780
BC 770 PRINTSPC(33)"{RVS}"INT(
      TM)
PR 780 IFINT(TM)<>0THEN720
CE 790 GOSUB830
FA 800 PRINT"{HOME}{9 DOWN}"SP
      C(32)"{RVS}OUT OF":PRIN
      T"{DOWN}"SPC(33)"{RVS}T
      IME"
QG 810 FORI=1TO2300:NEXT:TM=16
EF 820 PRINT"{HOME}{9 DOWN}"SP
      C(28)"{RVS}{11 SPACES}"
      :PRINT"{DOWN}"SPC(30)"
      {RVS}{7 SPACES}":GOTO61
      0
GS 830 PRINT"{HOME}{5 DOWN}":F
      ORI=1TO10:PRINTSPC(30)"
      {RVS}{5}{9 SPACES}":NEX
      T:PRINT"{HOME}":RETURN
CP 840 PRINTSPC(SP(WL));
CE 850 FORI=1TOWL:WW(I)=ASC(MI
      D$(WD$,I,1))+128:PRINTC
      HR$(WW(I));:NEXT:RETURN
SB 860 POKE204,0:GETNU$:NU=VAL
      (NU$):IFNU<N1ORNU>N2THE
      N860
EB 870 POKE204,1:POKE207,0:PRI
      NTNU$:FORI=1TO300:NEXT:
      RETURN
BF 1000 REM WORD LIST
KC 1010 REM ** 3 LETTER WORDS
      {SPACE}**
JD 1020 DATA MAN,FAN,FOR,ARM,P
      EN,WON,TOO,BOY,HOG,APE
      ,YOU,YEN,PAY,JOY,LEG
HG 1030 DATA YES,ROD,RAN,WIN,W
      AS,SUN,GAP,EAT,FAN,TAN
      ,TOP,TIP,COW,DOG,EAR
MP 1040 DATA -1
XS 1050 REM ** 4 LETTER WORDS
      {SPACE}**
KP 1060 DATA FAST,SLOW,GAME,WA
      RM,COLD,OPEN,ONLY,PAST
      ,READ,COST,JUMP,JUNK
HR 1070 DATA CAVE,VAST,VASE,WO
      MB,POST,NOTE,MAKE,BEND
      ,ZEST,DESK,HOST,GATE
CG 1080 DATA MOST,OPAL,TRIM,AC
      HE,BARK,LIMB
PX 1090 DATA -1
QK 1100 REM ** 5 LETTER WORDS
      {SPACE}**
```

```
KD 1110 DATA ACORN,ACTOR,BRING
        ,BROKE,BRIBE,CRIMP,COU
        GH,COUNT,DRESS,DEALT
CB 1120 DATA EIGHT,EARTH,FAITH
        ,GRAZE,GRAPE,GRAIN,GHO
        ST,GOING,HELLO,HAPPY
SK 1130 DATA IGLOO,MONEY,PARTY
        ,STAND,TENTH,WASTE,YOD
        EL,ZEBRA,MOUSE,TRAIT
BA 1140 DATA -1
CF 1150 REM ** 6 LETTER WORDS
        {SPACE}**
SS 1160 DATA MYSTIC,DIAPER,BAS
        KET,WASHER,RUBBER,ORAN
        GE,YELLOW,PURPLE
GP 1170 DATA QUAINT,EXCEED,JAC
        KET,ROBUST,GOLFER,ANTL
        ER,ENGAGE,MONKEY
GB 1180 DATA COWBOY,NOTION,SOD
        IUM,DOODLE,SALARY,WIND
        OW,BORROW,DESERT
HM 1190 DATA TROPHY,CARPET,POD
        IUM,MOTION,SICKLY,COME
        DY
DF 1200 DATA -1
```

Knock 31

Article on page 29.

```
FH 10 REM COPYRIGHT 1989 COMPU
      TE! PUBLICATIONS, INC. -
       ALL RIGHTS RESERVED
RM 20 PRINT"{CLR}{BLK}"TAB(12)
      "COPYRIGHT 1989"
FA 30 PRINTTAB(7)"COMPUTE! PUB
      LICATIONS, INC."
EQ 40 POKE53287,0
PA 50 PRINTTAB(10)"ALL RIGHTS
      {SPACE}RESERVED"
XD 60 FORTT=0TO3000:NEXT
CR 70 GOSUB1740:GOSUB1490:GOSU
      B1640
XH 80 GOSUB1210:KN=0:TN=0
QX 90 PRINTLEFT$(CD$,VT(DL)+1)
      TAB(21+(DL=10RDL=4)*9)"
      {RVS}{BLU}DEALER"
GM 100 TN=TN+1:FORL=1TO4
AC 110 ONPUGOSUB150,420,420,42
       0:PRINTCD$"{RVS}{BLU}
       {30 SPACES}{HOME}"
DB 120 PU=PU+1+(PU>4-1)*4:IFKN
       <>PUANDDP<52THENNEXT:GO
       TO100
BD 130 GOSUB720:DL=DL+1+(DL>4-
       1)*4:GOTO80
RX 140 REM======== P L A Y E R
        ============
QR 150 IFPT(1)<1THENRETURN
MC 160 POKESH,152:POKESV,154:P
       OKESP,1:T1=1:T2=152:T3=
       48:T4=154:WC=3
HP 170 PRINTCD$"{RVS}{BLU}
       {2 SPACES}CHOOSE FROM D
       ISCARDS OR DECK{HOME}":
       GOSUB320
AD 180 IFMVTHEN200
MK 190 DP=DP+1:UC=DP:PRINTLEFT
       $(CD$,12)TAB(21);:C3=DK
       (DP,3):C4=DK(DP,1):GOSU
       B1420
JF 200 POKESH,40:POKESV,114:T1
       =2:T2=40:T3=24:T4=114
AB 210 PRINTCD$"{RVS}{BLU}
       {5 SPACES}CHOOSE CARD T
       O DISCARD{3 SPACES}
       {HOME}":GOSUB320
DX 220 IFUP=0THEN270
SM 230 PRINTLEFT$(CD$,12)TAB(2
       1);:C3=DK(HN(1,MV+1),3)
       :C4=DK(HN(1,MV+1),1)
SC 240 GOSUB1420
GB 250 WC=MV+1:PRINTLEFT$(CD$,
       7)TAB(MV*3+1);:C3=DK(UC
       ,3):C4=DK(UC,1):GOSUB14
       20
SF 260 T=UC:UC=HN(1,MV+1):HN(1
       ,MV+1)=T
KK 270 POKESP,0:IFKNTHEN300
BP 280 PRINTCD$"{RVS}{BLU}
       {2 SPACES}DO YOU WANT T
       O KNOCK?{2 SPACES}[Y/N]
       {HOME}":GOSUB1010:GOSUB
       390
GD 290 IFQ$="Y"ORJS=30THENPRIN
       TLEFT$(CD$,8)TAB(12)"
       {RVS}{BLU}KNOCK!":KN=1:
       KT=TN:GOSUB1070
HJ 300 RETURN
SR 310 REM======== C H O O S E
        ============
XM 320 MV=0:UP=1:POKE198,0:GOS
       UB1010
HG 330 GOSUB390:FORL1=1TO99:NE
       XT:IFQ$=CHR$(13)ORJS=15
       THENRETURN
EM 340 IFQ$="↑"ORJS=23THENMV=M
       V+1:IFMV>T1THENMV=0
QH 350 IFQ$="*"ORJS=27THENMV=M
       V-1:IFMV<0THENMV=T1
BX 360 IFQ$="="ORJS=29THENPOKE
       SH,200:POKESV,154:UP=0:
       MV=1:GOTO330
FS 370 UP=1:POKESH,T2+MV*T3:PO
       KESV,T4:GOTO330
PB 380 REM========= I N P U T
       {SPACE}============
JR 390 GETQ$:JS=PEEK(56320)AND
       31:IFQ$=""ANDJS=31THEN3
       90
DX 400 WAIT56320,16,15:RETURN
SM 410 REM====== C O M P U T E
        R ==========
RQ 420 IFPT(PU)<1THENSC(PU)=0:
       RETURN
RQ 430 GOSUB650
PX 440 IF(DK(UC,2)<50RKN)ANDSC
       (PU)<21+(PL=2)THEN490
XF 450 T=99:XC=LC:FORL1=1TO4
AH 460 IFDK(HN(PU,L1),3)<>CSTH
       ENXC=L1
QX 470 NEXT
AR 480 IFXC<4THENPRINTCD$"
       {RVS}{BLU}{5 SPACES}"PL
       $(PU)" TAKES THE DISCAR
       D{2 SPACES}{HOME}":GOSU
       B1040:GOTO550
AK 490 DP=DP+1:UC=DP:PRINTCD$"
       {RVS}{BLU}{4 SPACES}"PL
       $(PU)" PICKS FROM THE D
       ECK{2 SPACES}{HOME}"
FB 500 GOSUB1040:GOSUB650
EB 510 T=99:XC=LC:FORL1=1TO4
EJ 520 IFDK(HN(PU,L1),3)<>CSTH
       ENXC=L1
MM 530 NEXT:IFXC<4THEN550
FF 540 PRINTLEFT$(CD$,12)TAB(2
       1);:C3=DK(UC,3):C4=DK(U
       C,1):WC=3:GOSUB1420:GOT
       O580
SS 550 PRINTLEFT$(CD$,12)TAB(2
       1);:C3=DK(HN(PU,XC),3):
       C4=DK(HN(PU,XC),1):WC=3
AK 560 GOSUB1420
HQ 570 T=UC:UC=HN(PU,XC):HN(PU
       ,XC)=T
CX 580 T=21-(TN>2)*1+-(TN>4)*1
       +-(TN>6)*1+(PL=2):IFPT(
       1)>0THEN610
QM 590 FORL1=1TO3:PRINTLEFT$(C
       D$,VT(PU))TAB(HT(PU)+(L
       1*3-3));
FE 600 C3=DK(HN(PU,L1),3):C4=D
       K(HN(PU,L1),1):WC=L1:GO
       SUB1420:NEXT
CM 610 IFKN<>0ORCC<TTHEN630
KQ 620 KN=PU:KT=TN:PRINTLEFT$(
       CD$,VT(PU)+1)TAB(21+(PU
       =4)*9)"{RVS}{BLU}KNOCK!
       ":GOSUB1070
GE 630 FORL1=1TO2000:NEXT:RETU
       RN
QJ 640 REM========= S C O R E
       {SPACE}============
FD 650 CC=0:HN(PU,4)=UC
EX 660 FORL1=1TO4:FORL2=1TO4
RE 670 T=0:FORL3=1TO4:IFL2=L3T
       HEN690
CM 680 IFDK(HN(PU,L3),3)=L1THE
       NT=T+DK(HN(PU,L3),2)
PE 690 NEXT:IFT>CCTHENCC=T:CS=
       L1:LC=L2:SC(PU)=CC
XJ 700 NEXT:NEXT:RETURN
EF 710 REM========= K N O C K
       {SPACE}============
QF 720 POKE198,0
QH 730 IFDP=52THENPRINTCD$"
       {RVS}{BLU}{9 SPACES}NO
       {SPACE}MORE CARDS!
       {HOME}":GOSUB1040
KE 740 PU=1:SC(1)=0:UC=0:GOSUB
       650:SC(1)=CC
HJ 750 T=0:T1=0:T2=0:FORL1=1TO
       4:IFPT(L1)<1THEN810
MG 760 PRINTLEFT$(CD$,VT(L1)+3
       )TAB(23+(L1=1ORL1=4)*11
       )"{RVS}{BLU}"SC(L1):GOS
       UB1010
CE 770 IFL1<>KNTHENIFSC(L1)=>S
       C(KN)THENT=T+1:IFSC(L1)
       >T1THENT1=SC(L1)
GH 780 FORL2=1TO3
GG 790 PRINTLEFT$(CD$,VT(L1))T
       AB(HT(L1)+(L2*3-3));
CM 800 C3=DK(HN(L1,L2),3):C4=D
       K(HN(L1,L2),1):WC=L2:GO
       SUB1420:NEXT
ME 810 NEXT
XH 820 IFDP=52THENPRINTCD$"
       {RVS}{BLU}{2 SPACES}HAN
       DS DUMPED -- NO WINNERS
       {2 SPACES}{HOME}":GOSUB
       1040:GOTO920
BD 830 IFT=0THEN860
MK 840 PRINTCD$"{RVS}{BLU}
       {6 SPACES}"PL$(KN)" LOS
       T TWO POINTS{4 SPACES}
       {WHT}{HOME}":PT(KN)=PT(
       KN)-2
DG 850 PRINTLEFT$(CD$,VT(KN)-2
       )TAB(HT(KN)+6)-(PT(KN)=
       >0)*PT(KN);:GOSUB1040:G
       OTO920
SX 860 T=1:IFKT=1ORSC(KN)=31TH
       ENT=2
QG 870 IFT=1THENPRINTCD$"{RVS}
       {BLU}{7 SPACES}"PL$(KN)
       " WON THE ROUND
       {5 SPACES}{WHT}{HOME}"
KE 880 IFT>1THENPRINTCD$"{RVS}
       {BLU}{4 SPACES}"PL$(KN)
       " WON A DOUBLE ROUND!
       {2 SPACES}{WHT}{HOME}"
JQ 890 GOSUB1040:FORL1=1TO4:PT
       (L1)=PT(L1)+(L1<>KN)*T:
       IFL1=KNORPL(L1)=-1THEN9
       10
JD 900 PRINTLEFT$(CD$,VT(L1)-2
       )TAB(HT(L1)+6)-(PT(L1)=
       >0)*PT(L1);
RM 910 NEXT
BJ 920 PL=4:FORL1=1TO4:PL=PL+(
       PT(L1)<1):PL(L1)=(PT(L1
       )<1):NEXT
RS 930 FORL1=1TO3000:NEXT:GOSU
       B1010
BP 940 IFPL=1THENPRINTCD$"
       {RVS}{BLU}{3 SPACES}GAM
       E OVER -- PRESS ANY KEY
        {HOME}":GOSUB390:RUN
RE 950 IFPT(1)>0THEN980
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EK 960 PRINTCD$"{RVS}{BLU}
       {3 SPACES}DO YOU WANT T
       O WATCH? [Y/N]{HOME}":G
       OSUB390
RH 970 ON-(Q$="Y"ORJS=30)GOTO9
       90:RUN
RC 980 PRINTCD$"{RVS}{BLU}
       {4 SPACES}PRESS ANY KEY
        TO CONTINE {HOME}":GO
       SUB390
CE 990 RETURN
CD 1000 REM========== B E E P
       {SPACE}==============
BJ 1010 POKESR,240:POKEWV,17:P
       OKEHF,50:POKELF,35:POK
       EAT,0
FC 1020 FORS1=1TO99:NEXT:POKEW
       V,16:POKESR,0:RETURN
DQ 1030 REM========== B O O P
       {SPACE}==============
XH 1040 POKEVL,15:POKEAT,0:POK
       ESR,225:POKEWV,17:POKE
       HF,33:POKELF,33
HJ 1050 FORS1=1TO99:NEXT:POKEW
       V,16:RETURN
SA 1060 REM========= K N O C K
        ============
KH 1070 FORS1=1TO3:POKESR,10:P
       OKEWV,129:POKEHF,30:PO
       KEAT,3
SB 1080 FORS2=1TO250:NEXT:POKE
       WV,128:NEXT:RETURN
BS 1090 REM======= S H U F F L
        E ===========
GQ 1100 PRINTCD$"{RVS}{BLU}
       {7 SPACES}SHUFFLING TH
       E DECK{5 SPACES}{HOME}
       ":GOSUB1040
DE 1110 IFRD(1)=0THENFORL=1TO5
       2:RD(L)=L:NEXT
PK 1120 FORL=1TO52:T=INT(RND(1
       )*52+1)
BQ 1130 T1=RD(L):RD(L)=RD(T):R
       D(T)=T1:NEXT
MB 1140 FORL=1TO52
HG 1150 DK(L,1)=RD(L)-13*INT((
       RD(L)-1)/13)
HB 1160 DK(L,2)=-(DK(L,1)>9)*1
       0-(DK(L,1)=1)*11:IFDK(
       L,2)=0THENDK(L,2)=DK(L
       ,1)
FR 1170 DK(L,3)=INT((RD(L))/13
       +.99)
RQ 1180 NEXT
MM 1190 RETURN
GG 1200 REM========== D E A L
       {SPACE}==============
RQ 1210 GOSUB1100:SYS900:RD=RN
       D(-TI)
JR 1220 T=DL:IFPT(DL)<1THENDL=
       DL+1+(DL>4-1)*4:GOTO12
       20
SR 1230 FORL1=1TO4:IFPT(L1)<1T
       HEN1290
CS 1240 PRINTLEFT$(CD$,VT(L1)-
       3)TAB(HT(L1))"{RVS}
       {BLU}{8 @}"
QH 1250 PRINTTAB(HT(L1))"{BLK}
       "LEFT$(PL$(L1)+"
       {2 SPACES}",5)" {2}"RI
       GHT$(STR$(PT(L1)),2)
QK 1260 PRINTTAB(HT(L1))"
       {DOWN}{BLU}{G}{1}{2 O}
       {BLU}{H}{1}{2 O}{BLU}
       {G}{1}{3 O}{BLU}{M}"
XM 1270 FORL2=1TO3:PRINTTAB(HT
       (L1))"{BLU}{G}{RVS}{1}
       {2 SPACES}{OFF}{BLU}
       {H}{RVS}{1}{2 SPACES}
       {OFF}{BLU}{G}{RVS}{1}
       {3 SPACES}{OFF}{BLU}
       {M}":NEXT
KD 1280 PRINTTAB(HT(L1))"{BLU}
       {G}{1}{2 U}{BLU}{H}{1}
       {2 U}{BLU}{G}{1}{3 U}
       {BLU}{N}"
KD 1290 NEXT
KA 1300 PRINTLEFT$(CD$,12)TAB(
       14)"{BLU}{G}{1}{3 O}
       {BLU}{M}{2 RIGHT}
       {4 SPACES}{RVS}{G}"CR$
       "{OFF}{G}{RVS}{1}
       {3 SPACES}{OFF}{BLU}
       {M}{2 RIGHT}{4 SPACES}
       {RVS}{G}"CR$"{OFF}{G}"
       ;
BX 1310 PRINT"{RVS}{1}
       {3 SPACES}{OFF}{BLU}
       {M}{2 RIGHT}{4 SPACES}
       {RVS}{G}"CR$"{OFF}{G}
       {RVS}{1}{3 SPACES}
       {OFF}{BLU}{M}{2 RIGHT}
       {4 SPACES}{RVS}{G}"CR$
       "{OFF}{G}{1}{3 U}{BLU}
       {M}{2 RIGHT}{4 SPACES}
       {RVS}{G}"
KM 1320 FORL1=1TO4:FORL2=1TO3:
       HN(L1,L2)=0:NEXT:NEXT
KR 1330 DP=0:FORL1=1TO3:FORL2=
       1TO4
MK 1340 T=T+1+(T>4-1)*4:IFPT(T
       )<1THEN1380
GC 1350 DP=DP+1:HN(T,L1)=DP:IF
       T>1ANDPT(1)>0THEN1380
KP 1360 PRINTLEFT$(CD$,VT(T))T
       AB(HT(T)+(L1*3-3));:C3
       =DK(DP,3):C4=DK(DP,1):
       WC=L1
MR 1370 GOSUB1420
JS 1380 NEXT:NEXT:DP=DP+1:UC=D
       P
FE 1390 PRINTLEFT$(CD$,12)TAB(
       21);:C3=DK(DP,3):C4=DK
       (DP,1):GOSUB1420
CK 1400 PU=T+1+(T>4-1)*4:RETUR
       N
MH 1410 REM== D I S P L A Y
       {3 SPACES}C A R D ====
       ==
MQ 1420 IFWC<3THEN1450
AC 1430 T$="{RVS}{BLU}{G}{OFF}
       {5 LEFT}{DOWN}"+CO$(C3
       ):PRINT"{OFF}"CO$(C3)C
       1$(C4)"{2 SPACES}"T$SU
       $(C3)"{3 SPACES}";
QK 1440 PRINTT$"{4 SPACES}"T$"
       {3 SPACES}"SU$(C3)T$"
       {2 SPACES}"C2$(C4)T$"
       {BLU}":RETURN
CQ 1450 T$="{BLU}{3 LEFT}
       {DOWN}"
AR 1460 PRINT"{OFF}"CO$(C3)C1$
       (C4)"{BLU}{M}"T$CO$(C3
       )SU$(C3)"{BLU} {M}"T$"
       {2 SPACES}{M}"T$"
       {2 SPACES}{M}"T$"
       {2 SPACES}{M}"
DQ 1470 RETURN
JR 1480 REM======= O P T I O N
        S ===========
RR 1490 POKE53281,15:POKE53280
       ,6
BJ 1500 PRINT"{CLR}{RVS}{BLU}R
       RRRRRRRRRRRRRRRRRRRRR
       RRRRRRRRRRRRRRRR{OFF}
       {3 @}{RVS} K N O C K
       {4 SPACES}";
KB 1510 PRINT"T H I R T Y
       {3 SPACES}O N E {OFF}
       {3 @}{RVS}{39 Y}{LEFT}
       {INST}{Y}
KS 1520 PRINTCD$"{UP}{4 LEFT}
       {RVS}{3 SPACES}{A}****
       ********************
       ******{S}{2 SPACES}
       {LEFT}{INST} "
GR 1530 PRINT"{RVS}{3 SPACES}-
       "TAB(36)"-{6 SPACES}
       {Z}********************
       ************{X}
       {2 SPACES}{LEFT}{INST}
       {HOME}"
SF 1540 SYS900
KB 1550 PRINTCD$"{RVS}
       {5 SPACES}STARTING POI
       NTS{3 SPACES}[10]
       {5 SPACES}{HOME}":GOSU
       B1010:T=10
DS 1560 GOSUB390:IFQ$=CHR$(13)
       ORJS=15THEN1600
KD 1570 IFQ$="£"ORJS=30THENT=
       T+5:IFT>25THENT=5
JJ 1580 IFQ$="="ORJS=29THENT=T
       -5:IFT<5THENT=25
DX 1590 PRINTCD$TAB(28)"{RVS}"
       RIGHT$(STR$(T),2)"
       {HOME}":GOTO1560
RM 1600 FORL=1TO4:PT(L)=T:PRIN
       TLEFT$(CD$,VT(L)-3)TAB
       (HT(L))"{RVS}{BLU}
       {8 @}"
XH 1610 PRINTTAB(HT(L))"{BLK}"
       LEFT$(PL$(L)+"
       {2 SPACES}",5)" {2}"RI
       GHT$(STR$(PT(L)),2):NE
       XT
HH 1620 RETURN
XQ 1630 REM======== D E A L E
       {SPACE}R ============
BK 1640 GOSUB1100:T=0:WC=3
QF 1650 PRINTCD$"{RVS}{BLU}
       {8 SPACES}FIRST ACE DE
       ALS{7 SPACES}{HOME}":G
       OSUB1040
CK 1660 FORL1=1TO52:T=T+1+(T>4
       -1)*4
FF 1670 PRINTLEFT$(CD$,VT(T))T
       AB(HT(T));:C3=DK(L1,3)
       :C4=DK(L1,1):GOSUB1420
JX 1680 FORL2=1TO350:NEXT
DC 1690 IFDK(L1,1)=1THEN1720
XP 1700 PRINTLEFT$(CD$,VT(T))T
       AB(HT(T));
RM 1710 PRINT"{RVS}{BLU}
       {5 SPACES}{5 LEFT}
       {DOWN}{5 SPACES}
       {5 LEFT}{DOWN}
       {5 SPACES}{5 LEFT}
       {DOWN}{5 SPACES}
       {5 LEFT}{DOWN}
       {5 SPACES}":NEXT
BP 1720 DL=T:RETURN
AC 1730 REM==== I N I T I A L
       {SPACE}I Z E ========
XH 1740 PL=4:PL$=" 20 5 0":CR$
       ="{DOWN}{12 LEFT}":CD$
       ="{HOME}{23 DOWN}
       {4 RIGHT}"
AF 1750 LF=54272:HF=54273:WV=5
       4276:AT=54277:SR=54278
       :POKELF+24,15
XF 1760 SH=53248:SV=53249:SP=5
       3269:POKE2040,13:POKES
       P,0:POKESH,85:POKESV,8
       5
XE 1770 DIM CC,C3,C4,CS,DL,DP,
       TN,KN,T,T1,T2,T3,T4,L,
       L1,L2,L3,PL,XC,LC,MV,U
       C,WC,Q$
MD 1780 DIM C1$(13),C2$(13),PL
       $(4)
DC 1790 DIM DK(52,3),HT(4),VT(
       4),HN(4,4),PT(4),PL(4)
       ,RD(52),SC(4)
FK 1800 FORL=1TO4:READPL$(L),H
       T(L),VT(L):NEXT
AJ 1810 FORL=1TO13:READC1$(L),
       C2$(L):NEXT
CH 1820 FORL=1TO4:READCO$(L),S
       U$(L):NEXT
EQ 1830 IFPEEK(895)=188THEN186
       0
```

```
RH 1840 FORL=0TO33:READD:POKE9
        00+L,D:NEXT
RR 1850 FORL=0TO63:READD:POKE8
        32+L,D:NEXT
GH 1860 RETURN
ED 1870 DATA "YOU{2 SPACES}",1
        ,7,COMP1,28,7,COMP2,28
        ,17,COMP3,1,17
MD 1880 DATA"A "," A","2 "," 2
        ","3 "," 3","4 "," 4",
        "5 "," 5","6 "," 6","7
         "," 7"
KB 1890 DATA"8 "," 8","9 "," 9
        ","10","10","J "," J",
        "Q "," Q","K "," K"
RK 1900 DATA "{BLK}","A","
        {RED}","S","{RED}","Z"
        ,"{BLK}","X"
FS 1910 DATA 162,190,169,160,1
        57,119,4,157,53,5,157,
        243,5,157,177,6,169,6,
        157,119
JF 1920 DATA 216,157,53,217,15
        7,243,217,157,177,218,
        202,208,225,96
XC 1930 DATA255,240,000,255,22
        4,000,131,192
RB 1940 DATA000,135,128,000,14
        3,192,000,153
EF 1950 DATA224,000,188,248,00
        0,247,060,000
CF 1960 DATA225,159,000,192,23
        1,128,000,051
PR 1970 DATA128,000,031,000,00
        0,006,000,000
QE 1980 DATA000,000,000,000,00
        0,000,000,000
PH 1990 DATA000,000,000,000,00
        0,000,000,000
BR 2000 DATA000,000,000,000,00
        0,000,000,188
```

Power BASIC: Quick Print

Article on page 68.

```
GD 10 REM COPYRIGHT 1989 COMPU
      TE! PUBLICATIONS - ALL R
      IGHTS RESERVED
HR 20 S=828:M=PEEK(65530):IFM=
      5THENBANK15:S=3072
ES 30 IFM=164THENS=818
KX 40 FORI=STOS+96:READA:POKEI
      ,A:X=X+A:NEXT:IFX<>13962
      THENPRINT"DATA ERROR.":S
      TOP
SG 50 POKES+1,S+97-INT((S+97)/
      256)*256:POKES+5,INT((S+
      97)/256)
DM 60 PRINT"{CLR}{3 SPACES}COP
      YRIGHT 1989 COMPUTE! PUB
      ., INC."
GH 70 PRINTTAB(11)"ALL RIGHTS
      {SPACE}RESERVED"
GE 80 PRINT"{4 DOWN}SYS"S"TO A
      CTIVATE."
FR 90 DATA 169,157,133,252,169
      ,3
RE 100 DATA 133,253,169,147,32
      ,210
DX 110 DATA 255,169,14,32,210,
      255
MA 120 DATA 160,0,32,207,255,1
      45
EJ 130 DATA 252,200,201,13,208
      ,246
EE 140 DATA 192,2,208,11,160,0
SR 150 DATA 177,252,160,2,201,
      88
JS 160 DATA 208,1,96,169,0,145
KC 170 DATA 252,169,4,170,160,
      7
AR 180 DATA 32,186,255,169,0,3
      2
GQ 190 DATA 189,255,32,192,255
      ,162
PB 200 DATA 4,32,201,255,160,0
GK 210 DATA 177,252,240,6,32,2
      10
JS 220 DATA 255,200,208,246,16
      9,4
MC 230 DATA 32,195,255,32,204,
      255
CA 240 DATA 169,13,32,210,255,
      208,177
```

Hi-Res Windows

See instructions in article on page 30 before typing in.

Program 1: Hi-Res Windows

```
C000:4C 64 C0 4C 50 C1 4C 51 11
C008:C2 4C 60 C1 4C FF C1 4C 58
C010:27 C2 4C 5E C2 4C 70 C2 30
C018:4C 7F C2 A9 00 A8 4C 8C 5A
C020:C2 A9 01 A0 00 4C 8C C2 A4
C028:A9 FF A0 00 4C 8C C2 4C F8
C030:43 C5 4C AE C5 4C 58 C7 11
C038:4C C9 C5 4C A3 C6 4C 03 A3
C040:C7 4C 65 C7 4C 7B C7 4C 0E
C048:8A C7 A9 00 A0 01 4C 8C 64
C050:C2 A9 01 A8 4C 8C C2 A9 0C
C058:FF A0 01 4C 8C C2 A9 30 D9
C060:85 34 85 38 AD 0E DC 29 6E
C068:FE 8D 0E DC A5 01 29 FB DB
C070:85 01 A9 00 85 04 A9 D0 8A
C078:85 05 A9 00 85 06 A9 30 FA
C080:85 07 A2 00 A0 00 B1 04 47
C088:91 06 C8 D0 F9 E6 05 E6 D6
C090:07 E8 E0 08 D0 EE A5 01 FA
C098:09 04 85 01 AD 0E DC 09 C8
C0A0:01 8D 0E DC AD 18 D0 29 2E
C0A8:F0 69 0C 8D 18 D0 20 FD 99
C0B0:AE 20 9E B7 8E D7 C4 20 5E
C0B8:FD AE 20 9E B7 8E D8 C4 41
C0C0:AD D7 C4 F0 0D C9 29 B0 49
C0C8:09 AD D8 C4 F0 04 C9 1A E6
C0D0:90 05 A2 0E 4C 37 A4 AE 48
C0D8:D7 C4 AC D8 C4 20 E4 C7 D2
C0E0:AD 1B C9 D0 ED 38 A9 00 E9
C0E8:ED 1A C9 8D D4 C4 AA A0 A9
C0F0:08 20 E4 C7 18 AD 1A C9 0D
C0F8:69 00 8D D0 C4 AD 1B C9 CA
C100:69 30 8D D1 C4 AE D7 C4 68
C108:A0 08 20 E4 C7 AD 1A C9 23
C110:8D D9 C4 AD 1B C9 8D DA 3A
C118:C4 AE D8 C4 A0 08 20 E4 5B
C120:C7 AD 1A C9 8D DB C4 AD E5
C128:DB C4 4A 4A 4A A8 A9 00 01
C130:8D F7 C4 8D DD C4 A2 00 31
C138:18 BD DD C4 6D D9 C4 9D 39
C140:DE C4 BD F7 C4 6D DA C4 F1
C148:9D F8 C4 E8 88 D0 E9 60 BB
C150:A9 15 8D 18 D0 A9 93 20 95
C158:D2 FF 60 A2 0E 4C 37 A4 30
C160:20 FD AE 20 9E B7 8E D5 12
C168:C4 20 FD AE 20 9E B7 8E 7A
C170:D6 C4 18 AD D5 C4 6D D7 E2
C178:C4 C9 29 B0 DE AD D6 C4 21
C180:6D D8 C4 C9 1A B0 D4 AE 12
C188:D6 C4 A0 28 20 E4 C7 18 7B
C190:AD D5 C4 6D 1A C9 8D 1A FC
C198:C9 A9 00 6D 1B C9 8D 1B 78
C1A0:C9 18 AD 1A C9 69 00 85 DF
C1A8:04 AD 1B C9 69 04 85 05 05
C1B0:18 AD 1A C9 69 00 85 06 E7
C1B8:8D D2 C4 AD 1B C9 69 D8 D6
C1C0:85 07 8D D3 C4 AD D8 C4 0B
C1C8:8D 1A C9 AE D4 C4 A0 00 B8
C1D0:8A 91 04 E8 AD DC C4 91 09
C1D8:06 C8 CC D7 C4 D0 F1 18 0E
C1E0:A5 04 69 28 85 04 A5 05 74
C1E8:69 00 85 05 18 A5 06 69 EE
C1F0:28 85 06 A5 07 69 00 85 68
C1F8:07 CE 1A C9 D0 D0 60 A0 BE
C200:00 AD D0 C4 85 04 AD D1 C0
C208:C4 85 05 A9 00 91 04 E6 C1
C210:04 D0 02 E6 05 38 A5 04 D2
C218:E9 00 8D 1C C9 A5 05 E9 DE
C220:38 0D 1C C9 D0 E5 60 A0 A4
C228:00 AD D0 C4 85 04 AD D1 E8
C230:C4 85 05 B1 04 49 FF 91 0C
C238:04 E6 04 D0 02 E6 05 38 F4
C240:A5 04 E9 00 8D 1C C9 A5 EC
C248:05 E9 38 0D 1C C9 D0 E3 30
C250:60 20 FD AE 20 9E B7 8A 2E
C258:29 0F 8D DC C4 60 20 8F 2D
C260:C4 A0 00 B1 04 0D 24 C9 F1
C268:91 04 AD DC C4 91 06 60 14
C270:20 8F C4 A0 00 AD 24 C9 55
C278:49 FF 31 04 91 04 60 20 86
C280:8F C4 A0 00 B1 04 4D 24 6F
C288:C9 91 04 60 8D 25 C9 8C FE
C290:26 C9 98 F0 06 20 E4 C8 01
C298:4C 9E C2 20 8F C4 A5 14 35
C2A0:8D 15 C9 A5 15 8D 16 C9 9A
C2A8:AD 12 C9 8D 17 C9 AD 26 FC
C2B0:C9 F0 06 20 E4 C8 4C BC B9
C2B8:C2 20 8F C4 20 EE C3 A2 CC
C2C0:00 38 AD 12 C9 ED 17 C9 29
C2C8:F0 0D 90 05 A2 01 4C D7 F5
C2D0:C2 49 FF 69 01 A2 FF 8D C0
C2D8:22 C9 8E 1F C9 A2 00 38 B6
C2E0:A5 14 ED 15 C9 8D 20 C9 DB
C2E8:A5 15 ED 16 C9 8D 21 C9 36
C2F0:0D 20 C9 F0 2A 90 05 A2 8D
C2F8:01 4C 1F C3 AD 21 C9 49 01
C300:FF 8D 21 C9 AD 20 C9 49 76
C308:FF 8D 20 C9 18 AD 20 C9 15
C310:69 01 8D 20 C9 AD 21 C9 51
C318:69 00 8D 21 C9 A2 FF 8E 7F
C320:1E C9 AD 1E C9 30 1B AD B3
C328:1F C9 30 37 38 AD 20 C9 AD
C330:ED 22 C9 8D 1A C9 AD 21 BD
C338:C9 E9 00 0D 1A C9 90 1B 24
C340:B0 21 AD 1F C9 10 14 38 FE
C348:AD 20 C9 ED 22 C9 8D 1A 34
C350:C9 AD 21 C9 E9 00 0D 1A 6C
C358:C9 90 08 A9 00 8D 23 C9 CA
C360:4C 68 C3 A9 FF 8D 23 C9 81
C368:A9 00 8D 13 C9 8D 14 C9 1E
C370:18 AD 20 C9 6D 22 C9 8D 25
C378:18 C9 AD 21 C9 69 00 8D C7
C380:19 C9 EE 18 C9 D0 06 EE F2
C388:19 C9 20 EE C3 AD 13 C9 C6
C390:0D 14 C9 D0 17 AD 23 C9 69
C398:F0 09 20 97 C7 20 D1 C7 82
C3A0:4C C0 C3 20 AE C7 20 BD 8B
C3A8:C7 4C C0 C3 AD 14 C9 30 FC
C3B0:09 20 97 C7 20 D1 C7 4C 58
C3B8:C0 C3 20 AE C7 20 BD C7 82
C3C0:AD 26 C9 F0 09 20 40 C8 03
C3C8:20 FA C8 4C D4 C3 20 44 37
C3D0:C4 20 A5 C4 20 EE C3 AD B5
C3D8:18 C9 D0 03 CE 19 C9 CE 66
C3E0:18 C9 AD 18 C9 0D 19 C9 9C
C3E8:F0 03 4C 8D C3 60 AC 26 2B
C3F0:C9 D0 18 AC 25 C9 F0 09 9A
C3F8:88 F0 0C 20 82 C2 4C 0A 46
C400:C4 20 61 C2 4C 0A C4 20 80
C408:73 C2 60 AC 25 C9 F0 09 0E
C410:88 F0 0C 20 8D C7 4C 0A CB
C418:C4 20 68 C7 4C 0A C4 20 C9
C420:7E C7 4C 0A C4 AD 12 C9 CF
C428:CD DB C4 90 02 38 60 38 1B
C430:A5 14 ED D9 C4 8D 1A C9 47
C438:A5 15 ED DA C4 0D 1A C9 9D
C440:B0 EB 18 60 AD 12 C9 18 87
C448:4A 4A 4A A8 18 AD D0 C4 3B
C450:79 DD C4 85 04 AD D1 C4 3E
C458:79 F7 C4 85 05 A5 14 29 9D
C460:F8 18 65 04 85 04 A5 05 E5
C468:65 15 85 05 AD 12 C9 29 5D
C470:07 18 65 04 85 04 A5 05 FC
C478:69 00 85 05 A5 14 29 07 8E
C480:49 07 AA A9 01 CA 30 03 F6
```

```
C488:0A D0 FA 8D 24 C9 60 20 AC
C490:FD AE 20 EB B7 8E 12 C9 6D
C498:20 25 C4 90 05 A2 0E 4C 38
C4A0:37 A4 20 44 C4 18 AD 12 2B
C4A8:C9 4A 4A 4A A8 18 AD D2 6B
C4B0:C4 79 11 C5 85 06 AD D3 EC
C4B8:C4 79 2A C5 85 07 18 A5 C2
C4C0:14 4A 4A 4A 18 65 06 85 BC
C4C8:06 A5 07 69 00 85 07 60 BA
C4D0:00 00 00 00 28 0A 05 0A D7
C4D8:0A 00 00 00 00 00 00 00 67
C4E0:00 00 00 00 00 00 00 00 6A
C4E8:00 00 00 00 00 00 00 00 72
C4F0:00 00 00 00 00 00 00 00 7A
C4F8:00 00 00 00 00 00 00 00 82
C500:00 00 00 00 00 00 00 00 8B
C508:00 00 00 00 00 00 00 00 93
C510:00 00 28 50 78 A0 C8 F0 6E
C518:18 40 68 90 B8 E0 08 30 5F
C520:58 80 A8 D0 F8 20 48 70 63
C528:98 C0 00 00 00 00 00 00 30
C530:00 01 01 01 01 01 01 02 3C
C538:02 02 02 02 02 02 03 03 C6
C540:03 03 03 A9 30 85 34 85 8E
C548:38 20 FD AE 20 9E B7 8E 1C
C550:09 C9 20 FD AE 20 9E B7 A1
C558:8E 0A C9 AD 09 C9 F0 0D 20
C560:C9 09 B0 09 AD 0A C9 F0 D3
C568:04 C9 09 90 05 A2 0E 4C AD
C570:37 A4 18 AE 09 C9 AC 0A 81
C578:C9 20 E4 C7 AD 1A C9 C9 3D
C580:09 B0 EA AA 18 69 E0 A8 95
C588:88 98 9D F7 07 88 CA D0 72
C590:F8 AE 09 C9 A0 18 20 E4 8C
C598:C7 AD 1A C9 8D 0B C9 AE 2E
C5A0:0A C9 A0 15 20 E4 C7 AD DA
C5A8:1A C9 8D 0C C9 60 AE 09 5C
C5B0:C9 AC 0A C9 20 E4 C7 AE FC
C5B8:1A C9 BD 51 C9 2D 15 D0 8E
C5C0:8D 15 D0 60 A2 0E 4C 37 95
C5C8:A4 20 FD AE 20 EB B7 8E 08
C5D0:08 C9 A5 14 8D 06 C9 A5 86
C5D8:15 8D 07 C9 20 FD AE 20 46
C5E0:9E B7 8E 0D C9 20 FD AE C5
C5E8:20 9E B7 8E 0F C9 38 A9 C5
C5F0:59 ED 06 C9 8D 1A C9 A9 14
C5F8:01 ED 07 C9 0D 1A C9 90 F2
C600:C3 AD 08 C9 C9 FB B0 BC D4
C608:8D 1C C9 A9 18 A2 00 AC 2F
C610:0D C9 F0 03 A9 30 CA 8D 16
C618:0E C9 8E 1D D0 A9 15 A2 BC
C620:00 AC 0F C9 F0 03 A9 2A 68
C628:CA 8D 10 C9 8E 17 D0 A2 32
C630:00 A0 00 AD 0A C9 8D 19 6C
C638:C9 AD 09 C9 8D 18 C9 AD E1
C640:06 C9 8D 1A C9 AD 07 C9 73
C648:8D 1B C9 AD 1A C9 9D 00 AA
C650:D0 B9 49 C9 49 FF 2D 10 2F
C658:D0 8D 10 D0 AD 1C C9 9D CF
C660:01 D0 AD 1B C9 F0 09 AD DB
C668:10 D0 19 49 C9 8D 10 D0 5F
C670:18 AD 1A C9 6D 0E C9 8D 1A
C678:1A C9 AD 1B C9 69 00 8D 6E
C680:1B C9 AD 15 D0 19 49 C9 5C
C688:8D 15 D0 E8 E8 C8 CE 18 EA
C690:C9 D0 B8 18 AD 1C C9 6D AE
C698:10 C9 8D 1C C9 CE 19 C9 99
C6A0:D0 97 60 AE 09 C9 AC 0A 46
C6A8:C9 20 E4 C7 0E 1A C9 2E D6
C6B0:1B C9 0E 1A C9 2E 1B C9 A8
C6B8:0E 1A C9 2E 1B C9 0E 1A 26
C6C0:C9 2E 1B C9 0E 1A C9 2E 59
C6C8:1B C9 0E 1A C9 2E 1B C9 C0
C6D0:A9 00 85 04 A9 38 85 05 62
C6D8:A9 00 91 04 E6 04 D0 02 98
C6E0:E6 05 AD 1A C9 D0 03 CE E0
C6E8:1B C9 CE 1A C9 AD 1A C9 F4
C6F0:0D 1B C9 D0 E3 A0 07 AD 6F
C6F8:11 C9 99 27 D0 88 C0 FF 51
C700:D0 F8 60 AE 09 C9 AC 0A FF
C708:C9 20 E4 C7 0E 1A C9 2E 38
C710:1B C9 0E 1A C9 2E 1B C9 0A
C718:0E 1A C9 2E 1B C9 0E 1A 87
C720:C9 2E 1B C9 0E 1A C9 2E BA
C728:1B C9 0E 1A C9 2E 1B C9 22
C730:A9 00 85 04 A9 38 85 05 C3
C738:B1 04 49 FF 91 04 E6 04 39
C740:D0 02 E6 05 AD 1A C9 D0 20
C748:03 CE 1B C9 CE 1A C9 AD 2D
C750:1A C9 0D 1B C9 D0 E1 60 68
C758:20 FD AE 20 9E B7 8A 29 61
C760:0F 8D 11 C9 60 20 E4 C8 AF
C768:A0 00 B1 04 0D 24 C9 91 DC
C770:04 AD 11 C9 AC 05 C9 99 D2
C778:27 D0 60 20 E4 C8 A0 00 69
C780:AD 24 C9 49 FF 31 04 91 1C
C788:04 60 20 E4 C8 A0 00 B1 FE
C790:04 4D 24 C9 91 04 60 AD A1
C798:1E C9 F0 11 30 09 A5 14 DD
C7A0:D0 02 C6 15 C6 14 60 E6 71
C7A8:14 D0 02 E6 15 60 AD 1F C9
C7B0:C9 F0 FA 30 04 CE 12 C9 0D
C7B8:60 EE 12 C9 60 18 AD 13 E4
C7C0:C9 6D 20 C9 8D 13 C9 AD 2B
C7C8:14 C9 6D 21 C9 8D 14 C9 0B
C7D0:60 38 AD 13 C9 ED 22 C9 99
C7D8:8D 13 C9 AD 14 C9 E9 00 A3
C7E0:8D 14 C9 60 A9 00 8D 1A FD
C7E8:C9 8D 1B C9 98 F0 16 8A FF
C7F0:F0 13 18 8A 6D 1A C9 8D 5E
C7F8:1A C9 A9 00 6D 1B C9 8D 36
C800:1B C9 88 D0 ED 60 8E 1A D7
C808:C9 8C 1C C9 A9 00 8D 1B 45
C810:C9 A2 FF E8 38 AD 1A C9 34
C818:ED 1C C9 8D 1A C9 AD 1B 28
C820:C9 E9 00 8D 1B C9 0D 1A 1E
C828:C9 B0 E8 8A 60 AD 12 C9 38
C830:CD 0C C9 90 02 38 60 A5 45
C838:14 CD 0B C9 B0 F7 18 60 3B
C840:A9 00 85 04 A9 38 85 05 D5
C848:A6 14 A0 18 20 06 C8 8D FF
C850:47 C9 AE 12 C9 A0 15 20 0A
C858:06 C8 8D 48 C9 18 AE 47 A8
C860:C9 A5 04 7D 27 C9 85 04 08
C868:A5 05 7D 2F C9 85 05 38 57
C870:A5 14 FD 3F C9 8D 1C C9 14
C878:4A 4A 4A 18 65 04 85 04 D6
C880:A5 05 69 00 85 05 AC 09 F5
C888:C9 AE 48 C9 A9 00 8D 05 BD
C890:C9 18 A5 04 7D 27 C9 85 A3
C898:04 A5 05 7D 2F C9 85 05 BE
C8A0:18 AD 05 C9 6D 48 C9 8D 94
C8A8:05 C9 88 D0 E4 38 AD 12 C2
C8B0:C9 FD 37 C9 8D 1A C9 18 AA
C8B8:0A 18 6D 1A C9 8D 1A C9 27
C8C0:18 A5 04 6D 1A C9 85 04 26
C8C8:A5 05 69 00 85 05 AD 1C 53
C8D0:C9 29 07 8D 1C C9 38 A9 6D
C8D8:07 ED 1C C9 AA BD 49 C9 32
C8E0:8D 24 C9 60 20 FD AE 20 F7
C8E8:EB B7 8E 12 C9 20 2D C8 43
C8F0:90 05 A2 0E 4C 37 A4 20 E9
C8F8:40 C8 18 AD 05 C9 6D 47 2C
C900:C9 8D 05 C9 60 00 00 00 1C
C908:00 00 00 00 00 00 00 00 9B
C910:00 00 00 00 00 00 00 00 A3
C918:00 00 00 00 00 00 00 00 AB
C920:00 00 00 00 00 00 00 00 B3
C928:40 80 C0 00 40 80 C0 00 99
C930:00 00 00 01 01 01 01 00 E1
C938:15 2A 3F 54 69 7E 93 00 7A
C940:18 30 48 60 78 90 A8 00 52
C948:00 01 02 04 08 10 20 40 9D
C950:80 FE FC F8 F0 E0 C0 80 20
C958:00 00 00 00 00 00 00 00 EB
```

Program 2: Hi-Res Windows Demo

```
GK 10 REM COPYRIGHT 1989 COMPU
      TE! PUBLICATIONS, INC. A
      LL RIGHTS RESERVED
SA 20 PRINT"{CLR}"TAB(13)"COPY
      RIGHT 1989":PRINTTAB(7)"
      COMPUTE! PUBLICATIONS, I
      NC."
CA 30 PRINTTAB(11)"ALL RIGHTS
      {SPACE}RESERVED"
PB 40 IFA=0THENA=1:LOAD"WINDOW
      S.ML",8,1
EB 50 PRINT"{CLR}{BLK}{2 DOWN}
      ":POKE53280,6:POKE53281,
      14
BB 60 REM FIRST WINDOW 1 DEMO
DB 70 SYS49152,20,3
QC 80 SYS49164
SH 90 SYS49158,0
MP 100 SYS49161,10,10
FK 110 REM DRAW BORDER
CX 120 SYS49179,0,0,159,0:SYS4
      9179,0,23,159,23
SS 130 SYS49179,0,0,0,23:SYS49
      179,159,0,159,23
HE 140 SYS49179,2,2,157,2:SYS4
      9179,2,21,157,21
DE 150 SYS49179,2,2,2,21:SYS49
      179,157,2,157,21
HE 160 REM FULL SCREEN BORDER
KS 170 FORI=1TO39
QR 180 POKE1024+I,200
PA 190 POKE1984+I,254
EB 200 NEXTI
GR 210 FORI=1TO23
JX 220 POKE1024+40*I,216:POKE1
      063+40*I,235
JE 230 NEXTI
BR 240 REM CORNERS
SD 250 POKE1024,196:POKE1063,2
      15
BJ 260 POKE1984,236:POKE2023,2
      55
MM 270 REM DRAW WAVE
JB 280 FORI=8TO151 STEP 3
ES 290 SYS49170,I,12+8*SIN(I/1
      0)*COS(I/5)
XJ 300 NEXTI
CP 310 FORI=1TO4
QM 320 SYS49167:FORJ=1TO200:NE
      XT
DM 330 NEXTI
BQ 340 REM BOUNCE WINDOW
EF 350 XP=10:YP=10:DX=2:DY=2
HQ 360 FORK=1TO100
HD 370 SYS49161,XP,YP
AP 380 XP=XP+DX:IFXP<0ORXP>20T
      HENDX=-DX:GOTO380
DD 390 YP=YP+DY:IFYP<0ORYP>22T
      HENDY=-DY:GOTO390
CX 400 NEXTK
MK 410 FORK=1TO2000:NEXT
BJ 420 REM NEW WINDOW
EJ 430 PRINT"{CLR}"
EC 440 SYS49152,10,10
BC 450 SYS49164
XQ 460 SYS49161,0,0:SYS49161,3
      0,0
BQ 470 SYS49161,0,15:SYS49161,
      30,15
EP 480 SYS49161,15,7
FH 490 FORI=0TO79
FJ 500 SYS49170,I,ABS(4*COS(I/
      5))
HJ 510 SYS49170,I,79-ABS(4*COS
      (I/5))
EE 520 SYS49170,ABS(4*COS(I/5)
      ),I
BC 530 SYS49170,79-ABS(4*COS(I
      /5)),I
CH 540 NEXTI
FF 550 REM PUT TEXT IN WINDOWS
FG 560 PRINT"{HOME}{8 DOWN}"TA
      B(16)"T{DOWN}E{DOWN}S
      {DOWN}T{DOWN}I{DOWN}N
      {DOWN}G{DOWN}!"
RC 570 REM BOUNCE LINE
CM 580 FORJ=1TO2
RG 590 FORI=8TO71 STEP 3
SB 600 SYS49192,8,I,71,I
SQ 610 SYS49192,I,8,I,71
GH 620 SYS49192,8,I,71,I
GR 630 SYS49192,I,8,I,71
XS 640 NEXTI
BC 650 REM AND BOUNCE IT BACK
CH 660 FORI=71TO8 STEP -3
CP 670 SYS49192,8,I,71,I
```

```
FA 680 SYS49192,I,8,I,71
MM 690 SYS49192,8,I,71,I
MA 700 SYS49192,I,8,I,71
KC 710 NEXTI
FD 720 NEXTJ
EK 730 REM WINDOW 2
SR 740 PRINT"{CLR}"
EM 750 SYS49161,0,0:REM KEEP W
       INDOW 1
KH 760 SYS49164
QM 770 FORX=0TO78 STEP 4
XJ 780 SYS49179,X,0,X,79
AR 790 SYS49179,X+1,0,X+1,79
JX 800 NEXTX
PD 810 FORY=0TO78 STEP 8
EJ 820 SYS49179,0,Y,79,Y:SYS49
       179,0,Y+1,79,Y+1
XC 830 NEXTY
MA 840 SYS49199,4,2
XD 850 SYS49199+6,1
JH 860 SYS49199+12
QR 870 SYS49226,0,0,95,0:SYS49
       226,0,0,0,41
DX 880 SYS49226,0,41,95,41:SYS
       49226,95,0,94,41
XH 890 SYS49226,0,0,95,41:SYS4
       9226,95,0,0,41
HF 900 POKE53248+27,0
XJ 910 FORX=248TO24STEP -2
JX 920 SYS49208,X,34+.7*X,0,0
AH 930 NEXTX
JA 940 FORT=1TO1500:NEXT
EX 950 SYS49208,24,50,0,1
AH 960 FORT=1TO1500:NEXT
MS 970 SYS49208,24,50,1,0
JF 980 FORT=1TO1500:NEXT
MD 990 SYS49208,24,50,1,1
GP 1000 SYS49208,25,50,0,0
GR 1010 POKE53248+27,255
XC 1020 FORT=1TO2000:NEXT:PRIN
        T"{CLR}"
SF 1030 SYS49164:SYS49155:SYS4
        9211:SYS49202
```

Dissolve 128

Article on page 60.

Program 1: Dissolve 128

```
RE 1 REM COPYRIGHT 1989 COMPUT
     E! PUBLICATIONS, INC. - A
     LL RIGHTS RESERVED
XQ 2 PRINT"{CLR}{3 SPACES}
     {YEL}COPYRIGHT 1989 COMPU
     TE! PUB., INC."
RB 3 PRINTTAB(11)"ALL RIGHTS R
     ESERVED"
AM 4 FOR TT=0TO3000:NEXT
CS 5 PRINT"{CLR}LOADING DATA..
     .13 SECONDS."
JB 10 S=4864:FORA=0TO775:READD
      $:D=DEC(D$)
GC 20 POKES+A,D:T=T+D:NEXTA
HD 30 IFT<>93638THENPRINT"ERRO
      R IN DATA STATEMENTS!!!"
      :END
DP 40 INPUT"{2 DOWN}HOW MANY C
      OLUMNS";C:IFC<1ORC>31THE
      N40
GM 50 INPUT"{2 DOWN}HOW MANY R
      OWS";R:IFR<1ORR>25THEN50
GK 60 C=C*8:POKE 5025,C:POKE 5
      237,C:POKE 5318,C:POKE 5
      360,C
RJ 70 POKE 5036,R:POKE 5323,R:
      POKE 5365,R
QB 80 BSAVE"DISSOLVE.OBJ",B0,P
      4864 TO P5645
QA 90 PRINT"{2 DOWN}DATA IS SA
      VED.":END
XJ 100 DATA 48,8A,48,98,48,B0,
       32,A9
XQ 110 DATA 15,85,FC,A9,00,85,
       FB,A9
RR 120 DATA D0,85,FD,A9,D8,85,
       FE,A9
ER 130 DATA 38,8D,8A,14,8D,91,
       14,A9
DS 140 DATA E9,8D,8B,14,8D,92,
       14,A9
JP 150 DATA 3D,8D,99,13,A9,11,
       8D,86
GG 160 DATA 13,A9,1D,8D,8F,13,
       4C,68
QB 170 DATA 13,A9,15,85,FC,A9,
       28,85
CC 180 DATA FB,A9,00,85,FD,A9,
       08,85
FB 190 DATA FE,A9,18,8D,8A,14,
       8D,91
ER 200 DATA 14,A9,69,8D,8B,14,
       8D,92
ED 210 DATA 14,A9,1D,8D,99,13,
       A9,31
GX 220 DATA 8D,86,13,A9,3D,8D,
       8F,13
JS 230 DATA 20,CD,13,20,20,14,
       A9,FF
CA 240 DATA 8D,0F,D4,A9,80,8D,
       12,D4
JP 250 DATA 8D,18,D4,A9,00,85,
       AB,85
KD 260 DATA AA,A2,00,AD,1B,D4,
       31,FB
PC 270 DATA 48,A9,3F,8D,00,FF,
       68,3D
JJ 280 DATA 00,94,48,A9,00,8D,
       00,FF
CB 290 DATA 68,1D,F8,2C,9D,F8,
       2C,E8
ER 300 DATA E0,40,D0,1E,20,4D,
       14,E6
QP 310 DATA AB,A5,AB,C9,04,D0,
       0E,20
GG 320 DATA 88,14,E6,AA,A5,AA,
       C9,1C
EM 330 DATA F0,65,4C,81,13,A4,
       FD,4C
FC 340 DATA 81,13,C8,C4,FE,D0,
       BC,20
CC 350 DATA A0,14,4C,83,13,A9,
       00,8D
KH 360 DATA 21,14,A9,20,8D,2F,
       14,68
DG 370 DATA 85,AA,68,85,AB,68,
       A8,C0
MJ 380 DATA 00,F0,15,AD,21,14,
       18,69
RG 390 DATA 40,8D,21,14,AD,2F,
       14,69
CK 400 DATA 01,8D,2F,14,88,4C,
       DF,13
JC 410 DATA 68,AA,E0,00,F0,15,
       AD,21
BH 420 DATA 14,18,69,08,8D,21,
       14,AD
CJ 430 DATA 2F,14,69,00,8D,2F,
       14,CA
BJ 440 DATA 4C,FA,13,68,8D,3D,
       14,A4
BP 450 DATA FD,A5,AB,48,A5,AA,
       48,60
CJ 460 DATA A9,F8,8D,9A,13,8D,
       9D,13
KR 470 DATA 8D,BF,14,8D,EC,14,
       A9,2C
JF 480 DATA 8D,9B,13,8D,9E,13,
       8D,C0
MB 490 DATA 14,8D,ED,14,A9,94,
       8D,91
EG 500 DATA 13,8D,C3,14,A9,00,
       8D,90
XG 510 DATA 13,8D,C2,14,60,AD,
       9A,13
RG 520 DATA 18,69,40,8D,9A,13,
       8D,9D
GK 530 DATA 13,8D,BF,14,8D,EC,
       14,AD
SQ 540 DATA 9B,13,69,01,8D,9B,
       13,8D
SE 550 DATA 9E,13,8D,C0,14,8D,
       ED,14
XC 560 DATA AD,90,13,18,69,40,
       8D,90
RC 570 DATA 13,8D,C2,14,AD,91,
       13,69
MK 580 DATA 00,8D,91,13,8D,C3,
       14,60
PC 590 DATA A5,FD,18,69,08,85,
       FD,A5
AQ 600 DATA FE,18,69,08,85,FE,
       A4,FD
DM 610 DATA A9,00,85,AB,20,20,
       14,60
XS 620 DATA A0,00,C8,C0,50,D0,
       FB,A4
CQ 630 DATA FD,60,48,8A,48,98,
       48,20
RK 640 DATA CD,13,20,20,14,A9,
       3F,8D
RF 650 DATA 00,FF,A2,00,A0,00,
       B9,F8
EQ 660 DATA 2C,99,00,94,C8,C0,
       40,D0
SX 670 DATA F5,E8,E0,04,F0,06,
       20,4D
PB 680 DATA 14,4C,BC,14,A9,00,
       8D,00
QK 690 DATA FF,60,48,8A,48,98,
       48,20
HQ 700 DATA CD,13,20,20,14,A2,
       00,A0
BS 710 DATA 00,A9,00,99,F8,2C,
       C8,C0
XB 720 DATA 40,D0,F8,E8,E0,04,
       F0,06
BD 730 DATA 20,4D,14,4C,E7,14,
       60,00
KF 740 DATA 00,00,00,00,00,00,
       00,00
FF 750 DATA 00,00,00,00,00,00,
       00,00
BE 760 DATA 00,00,00,00,00,00,
       00,00
RH 770 DATA 00,00,00,00,00,00,
       00,00
KG 780 DATA 00,00,00,00,00,00,
       00,00
HR 790 DATA 01,10,80,08,02,20,
       40,04
SB 800 DATA 10,80,08,02,20,40,
       04,01
AF 810 DATA 80,08,02,20,40,04,
       01,10
CC 820 DATA 08,02,20,40,04,01,
       10,80
QM 830 DATA 02,20,40,04,01,10,
       80,08
SJ 840 DATA 20,40,04,01,10,80,
       08,02
JS 850 DATA 40,04,01,10,80,08,
       02,20
MK 860 DATA 04,01,10,80,08,02,
       20,40
EJ 870 DATA 01,10,80,08,02,20,
       40,04
XK 880 DATA 09,50,84,28,82,21,
       42,14
XQ 890 DATA 29,54,86,29,C2,31,
       4A,94
GS 900 DATA 2B,55,A6,69,D2,35,
       CA,9C
AP 910 DATA AB,57,B6,6D,DA,75,
       EA,9D
FM 920 DATA AF,D7,B7,6F,FA,7D,
       FA,DD
EQ 930 DATA BF,DF,F7,EF,FB,7F,
       FE,FD
KK 940 DATA FF,FF,FF,FF,FF,FF,
```

```
        FF,FF
RJ 950 DATA FF,FF,FF,FF,FF,FF,
        FF,FF
AH 960 DATA FF,FF,FF,FF,FF,FF,
        FF,FF
EG 970 DATA FF,FF,FF,FF,FF,FF,
        FF,FF
JG 980 DATA FF,FF,FF,FF,FF,FF,
        FF,FF
QF 990 DATA FF,FF,FF,FF,FF,FF,
        FF,FF
PX 1000 DATA FF,FF,FF,FF,FF,FF
        ,FF,FF
JS 1010 DATA FF,FF,FF,FF,FF,FF
        ,FF,FF
RR 1020 DATA FF,FF,FF,FF,FF,FF
        ,FF,FF
CR 1030 DATA FF,FF,FF,FF,FF,FF
        ,FF,FF
HQ 1040 DATA FF,FF,FF,FF,FF,FF
        ,FF,FF
EP 1050 DATA FF,FF,FF,FF,FF,FF
        ,FF,FF
KM 1060 DATA FF,FF,FF,FF,FF,FF
        ,FF,FF
```

Program 2: Dissolve 128 Demo

```
FH 10 REM COPYRIGHT 1989 COMPU
      TE! PUBLICATIONS, INC. -
       ALL RIGHTS RESERVED
GD 20 BLOAD"DISSOLVE.OBJ",B0,P
      4864
PJ 30 COLOR0,2:COLOR1,7:COLOR4
      ,2:GRAPHIC1,1:GRAPHIC0
RE 40 PRINT"{CLR}"TAB(12)"
      {BLU}COPYRIGHT 1989":PRI
      NTTAB(7)"COMPUTE! PUBLIC
      ATIONS, INC."
DJ 50 PRINTTAB(10)"ALL RIGHTS
      {SPACE}RESERVED{DOWN}"
EX 60 L=PEEK(4625)+1:PRINT"THE
       LOWEST AVAILABLE PAGE F
      OR DATA{6 SPACES}STORAGE
       IS";L
JS 70 PRINT:PRINT:PRINT"PLEASE
       WAIT...HI-RES IMAGES BE
      ING DRAWN"
CA 80 CIRCLE1,172,104,20,14,15
      8,24:DRAW1TO180,99:DRAW,
      179,116TO179,110:CIRCLE1
      ,172,104,10,7,146,41:PAI
      NT1,153,104
PF 90 DRAW,181,98TO197,98TO192
      ,103TO181,103TO181,98:PA
      INT1,190,99
AC 100 DRAW,181,110TO197,110TO
       192,105TO181,105TO181,1
       10
KF 110 SYS 5290,76,19,11
SC 120 SCNCLR 1:CIRCLE1,164,11
       0,11,8:CIRCLE1,164,110,
       5,3:PAINT1,164,104
HK 130 SYS 5290,78,19,11
GP 140 SCNCLR1:DRAW,153,118TO1
       56,102TO161,102TO164,11
       0TO166,102TO171,102TO17
       4,118TO169,118TO168,112
       TO164,118TO159,112TO158
       ,118TO153,118:PAINT1,15
       5,117
PE 150 SYS 5290,80,19,11
FS 160 SCNCLR 1:DRAW,162,102TO
       154,102TO154,118TO162,1
       18:CIRCLE1,161,110,11,8
       ,0,180:DRAW,163,106TO16
       0,106TO160,114TO161,114
       :CIRCLE1,159,110,7,4,20
       ,160
GH 170 PAINT1,156,104
RJ 180 SYS 5290,82,19,11
DF 190 SCNCLR 1:DRAW1,165,102T
       O154,102TO154,118TO160,
       118TO160,113TO165,118TO
       171,118TO166,113:CIRCLE
       1,166,107,6,5,0,180
GS 200 DRAW,163,105TO160,105TO
       160,109TO163,109:CIRCLE
       1,161,107,5,2,0,180:PAI
       NT1,155,103
CX 210 SYS 5290,84,19,11
SF 220 SCNCLR 1:DRAW,166,102TO
       153,102TO153,118TO166,1
       18TO167,114TO159,114TO1
       59,112TO164,112TO164,10
       9TO159,109TO159,107TO16
       7,107TO166,102:PAINT1,1
       54,111
XC 230 SYS 5290,86,19,11
MS 240 SCNCLR 1:DRAW,160,118TO
       160,93TO157,95TO157,92T
       O160,89TO167,89TO167,11
       8TO160,118:PAINT1,162,1
       17
BB 250 SYS 5290,88,19,11
EQ 260 SCNCLR 1:CIRCLE1,164,95
       ,12,7,270,90:CIRCLE1,16
       4,95,12,11,90,150:CIRCL
       E1,184,116,24,14,280,32
       0:DRAW,160,113TO175,113
       TO175,118TO151,118
QC 270 CIRCLE1,184,116,33,19,2
       65,325:DRAW,161,95TO152
       ,95:CIRCLE1,164,95,3,2,
       270,90:CIRCLE1,152,95,1
       6,10,90,117: PAINT1,154
       ,93
KC 280 SYS 5290,90,19,11
CJ 290 SCNCLR 1:CIRCLE1,164,95
       ,10,7,210,150:CIRCLE1,1
       64,109,12,9,25,335:CIRC
       LE1,164,95,4,3:CIRCLE1,
       164,109,6,4:PAINT1,164,
       90
FD 300 SYS 5290,92,19,11:SCNCL
       R 1
JP 310 PRINT:PRINT:PRINT"PRESS
        ANY KEY TO START DEMO"
       :GETKEYA$
QX 320 GRAPHIC1,1
FJ 330 SYS 4864,76,6,10,1 :REM
        WRITE LOGO
BJ 340 SYS 4864,78,12,10,1
BM 350 SYS 4864,80,15,10,1
FS 360 SYS 4864,80,18,10,1
SX 370 SYS 4864,78,21,10,1
ES 380 SYS 4864,82,24,10,1
KH 390 SYS 4864,78,27,10,1
GK 400 SYS 4864,84,30,10,1
XD 410 SYS 4864,86,33,10,1
QX 420 SYS 4864,88,16,17,1
QK 430 SYS 4864,90,19,17,1
BP 440 SYS 4864,92,23,17,1
PH 450 A=88:B=4:T=25:GOSUB670:
       REM CHANGE BLOCK SIZE
JS 460 SYS 5290,94,16,17
       {2 SPACES}:REM SAVE "12
       8"
MX 470 A=248:T=10:GOSUB670
EM 480 SYS 5290,96,5,1
       {4 SPACES}:REM SAVE BLA
       NK
XC 490 SYS 5290,104,5,10
       {2 SPACES}:REM SAVE LOG
       O
DG 500 A$="{2 +}"{12 SPACES}:R
       EM BUILD OVERLAY
HJ 510 FORX=0TO39STEP2:CHAR1,X
       ,8,A$:CHAR1,X,10,A$:CHA
       R1,X,12,A$:CHAR1,X,14,A
       $
HR 520 CHAR1,38-X,9,A$:CHAR1,3
       8-X,11,A$:CHAR1,38-X,13
       ,A$:CHAR1,38-X,15,A$:NE
       XT
XA 530 SYS 5290,112,5,10
       {2 SPACES}:REM SAVE OVE
       RLAY
FJ 540 SYS 4864,104,5,10,1:REM
        DISPLAY LOGO
BG 550 SYS 4864,104,5,10,0:REM
        DISSOLVE{4 SPACES}OVER
       LAY
GA 560 SYS 4864,96,5,17,0 :REM
        DISSOLVE{4 SPACES}"128
       "
HG 570 SYS 4864,96,5,10,0 :REM
        DISSOLVE{4 SPACES}LOGO
BE 580 A=88:T=25:GOSUB670
GM 590 SYS 4864,94,15,10,1:REM
        MAKE "128" APPEAR
XR 600 A=96:GOSUB670
XP 610 SLEEP2:SYS 5338,,15,10:
       REM DISSOLVE "128"
DB 620 A=248:T=10:GOSUB670
BF 630 SYS 4864,112,5,10,1:REM
        RESTORE OVERLAY
PK 640 SLEEP2:GRAPHIC0:PRINT"
       {CLR}"
CM 650 A=64:T=80:GOSUB670
XX 660 END
RK 670 POKE5025,A:POKE5237,A:P
       OKE5318,A:POKE5360,A:RE
       M A = 8 X NO. OF COLUMN
       S
BK 680 POKE5036,B:POKE5323,B:P
       OKE5365,B:REM B = NO. O
       F ROWS
HC 690 POKE5284,T:RETURN:REM
       {2 SPACES}T = TIMING DE
       LAY
```

RAM Wedge 128

See instructions in article on page 50 before typing in.

```
0400:78 20 04 06 78 08 68 29 0B
0408:FB 48 A0 0F 8C D5 03 B9 A0
0410:37 04 99 F0 03 88 10 F7 49
0418:20 47 04 20 4A 0A A9 43 95
0420:8D 4A 03 A9 CC 8D 4B 03 B2
0428:A9 0D 8D 4C 03 A9 03 85 09
0430:D0 A9 00 48 4C F4 0A 08 E1
0438:78 AE 00 FF 8C 01 DF 8D DD
0440:00 FF 8E 00 FF 28 60 A9 25
0448:FA 8D B9 02 A9 00 85 FA DB
0450:A9 0A 85 FB A0 C6 A2 00 85
0458:B1 FA 20 AF 02 C8 D0 F6 C2
0460:A9 00 85 2F A9 15 85 30 BD
0468:AC 01 03 C0 0A F0 17 AE 64
0470:00 03 D0 01 88 CA 8E 12 02
0478:03 8C 13 03 A9 C6 8D 00 3B
0480:03 A9 0A 8D 01 03 60 93 F6
0488:94 F1 95 EE F5 F2 00 00 74
0490:00 00 00 00 00 00 00 00 98
0498:00 00 00 00 00 00 00 00 A0
04A0:00 00 00 00 00 00 00 00 A8
04A8:00 00 00 00 00 00 00 00 B0
04B0:00 00 00 00 08 00 00 80 79
04B8:11 0C 00 0B F6 05 CD 08 6C
04C0:C2 07 3A 09 7B 09 47 0A 5C
04C8:00 00 85 9B 08 68 85 9C C4
04D0:A9 03 48 A9 7F 48 4C CF 97
04D8:0A 85 9B 08 68 85 9C A9 77
04E0:FF 48 A9 D1 48 4C CF 0A 6A
04E8:85 9B 08 68 85 9C A9 03 17
04F0:48 A9 85 48 4C CF 0A 85 F7
04F8:9B 08 68 85 9C A9 A7 48 59
0500:A9 E0 48 4C CF 0A 85 9B 32
0508:08 68 85 9C A9 88 48 A9 54
0510:0E 48 4C CF 0A 85 9B 08 5F
0518:68 85 9C A9 88 48 A9 11 AF
0520:48 4C CF 0A 85 9B 08 68 0F
0528:85 9C A9 8E 48 A9 2D 48 C5
0530:4C CF 0A 85 9B 08 68 85 41
0538:9C A9 52 48 A9 53 48 4C 41
0540:CF 0A 85 9B 08 68 85 9C A8
0548:A9 AF 48 A9 86 48 4C CF 74
0550:0A 85 9B 08 68 85 9C A9 F0
0558:AF 48 A9 8F 48 A5 9C 25 B1
0560:FB 48 A5 9B 48 A9 00 4C 1E
```

```
0568:F4 0A 85 9B 08 68 85 9C 63
0570:AD 13 03 48 AD 12 03 48 FE
0578:A5 9C 25 FB 48 A5 9B 48 39
0580:A9 00 4C F4 0A 85 9B 08 DD
0588:68 85 9C A9 03 48 A9 C8 AB
0590:48 4C CF 0A 85 9B 08 68 7F
0598:85 9C A9 7A 48 A9 AE 48 F7
05A0:4C CF 0A 85 9B A9 0A 48 3E
05A8:A9 EE 48 A9 03 48 A9 B6 2A
05B0:48 A5 9B 60 20 69 07 20 96
05B8:CA 04 C9 22 F0 0C 20 77 F3
05C0:07 90 26 B0 02 A2 17 68 73
05C8:68 60 A2 01 20 C1 08 D0 6C
05D0:0A A5 3D D0 02 C6 3E C6 6C
05D8:3D D0 0E C9 22 F0 0A 9D 9A
05E0:8E 04 E8 E0 11 B0 DE 90 F7
05E8:E3 E0 01 D0 05 A2 08 68 75
05F0:68 60 20 4A 06 60 20 F7 D9
05F8:04 F0 06 20 CA 04 A2 00 AF
0600:60 20 CA 04 48 A9 00 85 4C
0608:24 A9 0D 85 25 A9 00 A8 03
0610:AA 91 24 E6 24 D0 FA E6 0A
0618:25 A5 25 C9 15 90 EE A2 CC
0620:0D A9 00 9D A4 04 CA D0 92
0628:FA 9D A4 04 A9 7E 8D 00 50
0630:FF AD 00 DF 29 10 F0 09 1A
0638:A9 08 8D B4 04 68 A2 00 1F
0640:60 A9 02 8D B4 04 68 A2 29
0648:00 60 A9 00 85 24 A9 0D BE
0650:85 25 A0 00 B9 8F 04 F0 81
0658:39 C9 3F F0 14 C9 2A F0 77
0660:06 D1 24 D0 1B F0 0A C0 E6
0668:00 D0 0D B1 24 D0 09 F0 CC
0670:21 C8 D0 E0 B1 24 D0 08 2F
0678:18 A9 11 65 24 85 24 60 53
0680:18 A9 20 65 24 85 24 A9 86
0688:00 A8 65 25 85 25 C9 15 27
0690:90 C2 C0 00 D0 DE C8 B1 F2
0698:24 30 E5 38 60 A9 00 85 32
06A0:24 A9 0D 85 25 A0 00 B1 80
06A8:24 F0 15 18 A9 20 65 24 E3
06B0:85 24 A9 00 65 25 85 25 AD
06B8:C9 15 90 E9 A2 01 38 60 89
06C0:A0 FF C8 B9 8F 04 91 24 A5
06C8:D0 F8 A0 11 AD A0 04 91 2A
06D0:24 C8 AD A1 04 91 24 A0 40
06D8:17 B1 24 CD A3 04 90 2D B9
06E0:F0 04 A0 16 D0 1A 88 B1 8D
06E8:24 CD A2 04 90 1F F0 10 02
06F0:B0 0E A0 13 68 91 24 C8 B8
06F8:68 91 24 C8 68 91 24 C8 49
0700:AD A2 04 91 24 C8 AD A3 6A
0708:04 91 24 18 60 A2 00 A0 B0
0710:01 20 5F 07 AD A3 04 CD D4
0718:B5 04 90 0A E8 C8 C8 EC 9D
0720:B4 04 B0 34 90 EB 8A 48 74
0728:B9 A4 04 48 88 B9 A4 04 B9
0730:48 AD A2 04 18 79 A4 04 56
0738:99 A4 04 AD A3 04 79 A5 5D
0740:04 99 A5 04 18 B9 A4 04 A0
0748:69 01 99 A4 04 B9 A5 04 1F
0750:69 00 99 A5 04 4C F2 06 DD
0758:20 8B 09 A2 10 38 60 A9 70
0760:FF 38 F9 A4 04 8D B5 04 CB
0768:60 A9 00 A0 11 99 8F 04 2D
0770:88 D0 FA 99 8F 04 60 20 5D
0778:94 05 85 24 84 25 A5 0F 18
0780:C9 FF F0 03 A2 0B 60 A0 64
0788:00 20 A3 05 48 C8 20 A3 AC
0790:05 48 C8 20 A3 05 85 25 AF
0798:68 85 24 68 A8 D0 04 A2 7A
07A0:08 38 60 88 C0 11 B0 02 03
07A8:90 03 A2 17 60 20 A3 05 55
07B0:99 8F 04 88 10 F7 A5 3D 61
07B8:D0 02 C6 3E C6 3D 18 A2 6A
07C0:00 60 A9 00 85 16 A9 0D 01
07C8:85 17 AD B4 04 C9 02 F0 9C
07D0:24 A0 00 B9 DE 07 F0 41 EA
07D8:20 D9 04 C8 D0 F5 0D 12 05
07E0:22 52 41 4D 57 45 44 47 31
07E8:45 20 31 32 38 20 31 37 C6
07F0:35 30 22 92 00 A0 00 B9 4F
07F8:02 08 F0 1D 20 D9 04 C8 33
0800:D0 F5 0D 12 22 52 41 4D E2
0808:57 45 44 47 45 20 31 32 51
0810:38 20 31 37 30 30 22 92 F6
0818:00 2C B7 04 10 05 A9 56 A8
0820:20 D9 04 A9 0D 20 D9 04 72
0828:A0 00 B1 16 F0 64 48 A9 73
0830:0D 20 D9 04 A9 22 20 D9 3A
0838:04 68 20 D9 04 C8 B1 16 C2
0840:F0 06 20 D9 04 C8 D0 F6 C7
0848:A9 22 20 D9 04 A9 20 20 7E
0850:D9 04 A9 28 20 D9 04 A0 17
0858:13 B1 16 85 3B C8 B1 16 EF
0860:85 3C 20 24 05 A9 2C 20 CF
0868:D9 04 A0 15 B1 16 85 3B F7
0870:A9 00 85 3C 20 24 05 A9 0F
0878:2C 20 D9 04 A0 16 B1 16 F8
0880:85 3B C8 B1 16 85 3C 20 B5
0888:24 05 A9 29 20 D9 04 4C 70
0890:A2 08 C8 B1 16 30 0B A9 59
0898:0D 20 D9 04 20 CA 04 A2 89
08A0:00 60 18 A5 16 69 20 85 42
08A8:16 90 02 E6 17 A5 17 C9 DD
08B0:15 90 0B A9 0D 20 D9 04 0C
08B8:20 CA 04 A2 00 60 4C 28 78
08C0:08 E6 3D D0 02 E6 3E A0 0C
08C8:00 20 85 05 60 2C B7 04 09
08D0:10 0B A9 00 8D B7 04 20 54
08D8:CA 04 A2 00 60 A9 80 8D DB
08E0:B7 04 30 F3 2C B7 04 30 8B
08E8:01 60 A5 B0 09 20 85 B0 D5
08F0:60 2C B7 04 30 04 18 A2 D7
08F8:00 60 AD 00 DF 29 40 F0 EB
0900:14 A0 87 A9 3F 20 F0 03 2F
0908:AD 00 DF 29 20 D0 03 A2 6C
0910:00 60 A2 1C 60 A2 1A 60 72
0918:A0 11 B9 28 09 20 D9 04 F8
0920:88 10 F7 A2 FF 4C 6A 05 AE
0928:52 4F 52 52 45 20 53 54 4C
0930:53 49 58 45 20 45 4C 49 95
0938:46 3F 20 B4 05 90 03 A2 9F
0940:04 60 A5 24 85 C5 A5 25 17
0948:85 B0 20 CA 04 C9 A4 F0 7B
0950:03 A2 0B 60 20 B4 05 B0 82
0958:03 A2 02 60 A5 B0 85 25 FA
0960:A5 C5 38 E9 11 85 24 A0 E3
0968:00 B9 8F 04 91 24 F0 05 1F
0970:C8 C0 11 90 F4 20 CA 04 04
0978:A2 00 60 20 B4 05 B0 05 0A
0980:20 F7 04 F0 06 20 CA 04 7A
0988:A2 00 60 A5 24 38 E9 11 39
0990:85 24 A9 00 A8 91 24 C8 40
0998:B1 24 09 80 91 24 20 4A 5D
09A0:06 90 E8 20 CA 04 A2 00 A4
09A8:60 E0 00 F0 07 E0 02 D0 C2
09B0:0A 4C 18 09 68 68 68 68 8C
09B8:4C 51 05 4C 6A 05 E0 0B DE
09C0:D0 E7 20 2E 0A B0 E2 A2 97
09C8:00 DD 87 04 F0 09 E8 E0 E1
09D0:08 90 F6 A2 0B B0 D2 8A 5F
09D8:0A AA BD B8 04 8D C8 04 C9
09E0:BD B9 04 8D C9 04 A9 09 54
09E8:48 A9 A8 48 6C C8 04 A0 52
09F0:00 A2 02 AD 30 D0 48 A9 C5
09F8:00 8D 30 D0 8D 09 DF B1 83
0A00:24 9D 00 DF E8 C8 E0 08 BF
0A08:90 F5 B1 24 9D 00 DF 20 27
0A10:E4 08 A5 C5 8D 06 D5 A4 7E
0A18:B0 A9 3F 20 F0 03 20 F1 9E
0A20:08 AD 06 D5 29 B5 8D 06 03
0A28:D5 68 8D 30 D0 60 A5 3D 86
0A30:D0 02 C6 3E C6 3D 20 E8 3E
0A38:04 AA 20 CA 04 E0 52 D0 C2
0A40:02 18 60 A2 0B 38 60 A2 2E
0A48:00 60 A0 00 B9 58 0A F0 BC
0A50:06 20 D9 04 C8 D0 F5 60 C0
0A58:93 0D 20 20 20 20 20 20 61
0A60:20 20 20 20 20 20 20 20 74
0A68:52 41 4D 57 45 44 47 45 24
0A70:20 31 32 38 20 0D 0D 20 1A
0A78:20 20 20 20 20 20 20 20 8C
0A80:20 20 20 20 20 20 41 43 F9
0A88:54 49 56 41 54 45 44 21 59
0A90:20 0D 0D 20 20 43 4F 50 98
0A98:59 52 49 47 48 54 20 31 90
0AA0:39 38 39 20 43 4F 4D 50 CA
0AA8:55 54 45 21 20 50 55 42 66
0AB0:4C 49 43 41 54 49 4F 4E 6E
0AB8:53 20 0D 0D 00 39 38 39 7F
0AC0:0D 0D 00 0D 00 00 78 A0 01
0AC8:7E 8C 00 FF 4C BE 09 A9 58
0AD0:00 8D 00 FF 68 85 9E 68 47
0AD8:85 9F A9 0A 48 A9 EE 48 7C
0AE0:A5 9F 48 A5 9E 48 A5 9C 11
0AE8:29 FB 48 A5 9B 28 60 78 AA
0AF0:08 48 A9 7E 8D 00 FF 68 0D
0AF8:28 60 EA EA EA 93 94 F1 06
0B00:20 B4 05 B0 03 A2 02 60 06
0B08:AD 06 D5 85 C5 20 CA 04 D1
0B10:C9 00 F0 77 C9 3A F0 73 2D
0B18:C9 2C F0 03 A2 0B 60 20 8E
0B20:CA 04 C9 42 D0 1B 20 CA F7
0B28:04 AA 20 CA 04 E0 31 F0 92
0B30:07 E0 30 F0 09 A2 27 60 98
0B38:A5 C5 09 40 85 C5 20 CA 06
0B40:04 20 15 05 8C A0 04 8D CF
0B48:A1 04 20 06 05 8C A2 04 38
0B50:8D A3 04 AD A1 04 CD A3 CD
0B58:04 90 0D F0 03 A2 0E 60 64
0B60:AD A0 04 CD A2 04 B0 F5 4F
0B68:38 AD A2 04 ED A0 04 8D 22
0B70:A2 04 AD A3 04 ED A1 04 E7
0B78:8D A3 04 20 9D 06 90 01 E7
0B80:60 20 B8 0B A9 84 85 B0 B1
0B88:4C EF 09 A5 2D 8D A0 04 21
0B90:A5 2E 8D A1 04 A9 9E 8D 62
0B98:AA 02 A9 10 85 9E A9 12 C6
0BA0:85 9F A0 00 A2 00 20 A2 6D
0BA8:02 8D A2 04 C8 A2 00 20 A8
0BB0:A2 02 8D A3 04 4C 53 0B 87
0BB8:20 4A 06 AD 8F 04 C9 40 6D
0BC0:F0 01 60 AD 90 04 C9 3A D8
0BC8:D0 F8 A5 24 48 A5 25 48 E7
0BD0:A0 00 A2 02 BD 8F 04 99 79
0BD8:8F 04 E8 C8 C0 10 90 F4 BD
0BE0:20 4A 06 B0 0B 20 8B 09 5E
0BE8:A5 3D D0 02 C6 3E C6 3D 55
0BF0:68 85 25 68 38 E9 11 85 D8
0BF8:24 A0 11 A9 00 91 24 88 1D
0C00:10 FB C8 B9 8F 04 F0 05 47
0C08:91 24 C8 D0 F6 20 4A 06 EA
0C10:60 20 B4 05 90 03 A2 04 21
0C18:60 AD 06 D5 85 C5 20 CA 38
0C20:04 C9 2C F0 03 4C 7B 0C 8D
0C28:20 CA 04 F0 47 C9 3A F0 59
0C30:43 C9 42 D0 27 20 CA 04 05
0C38:C9 30 F0 0D C9 31 F0 03 28
0C40:A2 27 60 A5 C5 09 40 85 32
0C48:C5 20 CA 04 F0 26 C9 3A D2
0C50:F0 22 C9 2C F0 03 A2 0B 49
0C58:60 20 CA 04 20 15 05 8C 2E
0C60:02 DF 8D 03 DF 20 4A 06 6D
0C68:A2 04 A0 02 A9 85 85 B0 26
0C70:20 F3 09 60 A9 85 85 B0 DB
0C78:4C EF 09 A5 2D 8D 02 DF B1
0C80:A5 2E 8D 03 DF A0 05 B1 16
0C88:24 C8 18 65 2D 85 9E 98 93
0C90:48 A5 9E 48 A9 9E 8D B9 2B
0C98:02 A9 10 85 9E A9 12 85 BB
0CA0:9F A0 00 A2 00 68 20 AF 6C
0CA8:02 68 A8 B1 24 65 2E A0 BF
0CB0:01 A2 00 20 AF 02 20 68 22
0CB8:0C 24 7F 10 16 20 33 05 6D
0CC0:E6 3D D0 02 E6 3E 20 CA 11
0CC8:04 85 16 20 CA 04 85 17 91
0CD0:20 33 05 20 42 05 A2 00 D3
0CD8:60 EA EA EA EA EA 00 00 EA
```

Shades

Article on page 52.

```
MB 10 REM COPYRIGHT 1989 COMPU
      TE PUBLICATIONS, INC. -
      {SPACE}ALL RIGHTS RESERV
      ED
XK 20 GOSUB1000:REM INSTALL SH
      ADES
JR 30 RESTORE:SYS49152,0,0,2,8
      ,7,1
XH 40 PRINT"{HOME}{DOWN}{RVS}"
      TAB(16)"SHADES"
KJ 50 PRINTTAB(12)"{DOWN}{RVS}
      COPYRIGHT 1989"
MJ 60 PRINTTAB(6)"{RVS}COMPUTE
```

```
      ! PUBLICATIONS, INC."
MX 70 PRINTTAB(10)"{RVS}ALL RI
      GHTS RESERVED"
SR 80 PRINT"{DOWN}{40 SPACES}"
HX 90 PRINTTAB(5)"{RVS}SHADES
      {SPACE}PROVIDES A NEW GR
      APHICS
GJ 100 PRINTTAB(5)"{DOWN}{RVS}
       MODE THAT ENHANCES TEXT
       WITH
RE 110 PRINTTAB(5)"{DOWN}{RVS}
       A FOUR COLOR SHADING EF
       FECT.
SB 120 PRINTTAB(5)"{DOWN}{RVS}
       YOU CAN EASILY TRANSFOR
       M YOUR
HC 130 PRINTTAB(5)"{DOWN}{RVS}
       NORMAL TEXT SCREENS INT
       O
RG 140 PRINTTAB(5)"{DOWN}{RVS}
       PROFESSIONAL LOOKING DI
       SPLAYS.
KK 150 PRINT"{DOWN}{40 SPACES}
       "
CM 160 PRINTTAB(5)"{RVS}PRESS
       {SPACE}ANY KEY TO CHANG
       E COLORS
HM 170 PRINTTAB(10)"{RVS}OR <R
       ETURN> TO EXIT";
CJ 180 POKE198,0:WAIT198,1:GET
       A$:IFA$=CHR$(13)THEN220
JF 190 READC1,C2,C3,C4:IFC1=-1
       THENRESTORE:GOTO180
FF 200 SYS49250,C1,C2,C3,C4:GO
       TO180
RC 210 SYS49250,0,C2,C3,C4:GOS
       UB240:SYS49250,0,0,C3,C
       4:GOSUB240
ME 220 SYS49250,0,0,0,C3:GOSUB
       240:SYS49250,0,0,0,0:SY
       S49275:PRINT"{CLR}{BLU}
       ":END
HS 230 DATA14,1,8,7,1,7,8,2,14
       ,1,8,9,5,7,8,9,6,14,8,2
       ,6,14,3,1,-1,-1,-1,-1
GQ 240 FORDL=1TO100:NEXT:RETUR
       N
FA 1000 POKE785,232:POKE786,7:
        POKE209,232:POKE210,7:
        POKE211,0:POKE213,39
SF 1010 RL=1050:PRINT" S{RVS}&
        ${OFF}{*}{RVS}HD{OFF}A
        {RVS}${OFF}
        {SHIFT-SPACE}{RVS}D
        {OFF}B{SHIFT-SPACE}":S
        YS47083(RL),USR(0)
QE 1020 FORU=49152TO49358:READ
        Q:POKEU,Q:CK=CK+Q:NEXT
QG 1030 IFCK<>26792THENPRINT"E
        RROR IN DATA":END
DA 1040 RETURN
MB 1050 DATA162,26,181,216,9,1
        28,149,216,202,208,247
        ,32,155,183,142,32,208
        ,32
CS 1060 DATA155,183,169,160,16
        0,251,153,255,3,153,24
        9,4,153,243,5,153,237,
        6
KB 1070 DATA136,208,241,138,16
        0,251,153,255,215,153,
        249,216,153,243,217,15
        3,237
SA 1080 DATA218,136,208,241,14
        1,134,2,120,169,127,14
        1,13,220,169,1,141,26,
        208,169
HQ 1090 DATA48,133,251,141,18,
        208,169,27,141,17,208,
        169,152,141,20,3,169,1
        92
BJ 1100 DATA141,21,3,169,5,133
        ,2,88,32,155,183,142,1
        69,2,32,155,183,142
DJ 1110 DATA168,2,32,155,183,1
        42,167,2,32,155,183,14
        2,170,2,96,120,169,49
BR 1120 DATA141,20,3,169,234,1
        41,21,3,169,240,141,26
        ,208,169,255,141,13,22
        0
SG 1130 DATA173,169,2,141,33,2
        08,88,96,169,1,141,25,
        208,198,2,208,4,162
KR 1140 DATA4,134,2,166,2,189,
        166,2,141,33,208,165,2
        51,24,105,2,201,252
KX 1150 DATA176,11,133,251,141
        ,18,208,104,168,104,17
        0,104,64,169,48,133,25
        1,141
SX 1160 DATA18,208,169,5,133,2
        ,76,49,234
```

Super Slideshow

Article on page 56.

Program 1: Slideshow Creator

```
FH 10 REM COPYRIGHT 1989 COMPU
      TE! PUBLICATIONS, INC. -
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MC 20 DIMFO$(13),F$(50),T(50),
      M$(50)
QQ 30 FORI=1TO13:READFO$(I):NE
      XT:POKE53280,.:POKE53281
      ,.:GOTO170
PJ 40 INPUT"{CLR}{WHT}{2 DOWN}
      {2 RIGHT}HOW MANY PICTUR
      ES";P
RS 50 IFP<1THEN170
BS 60 Z=.:INPUT"{3 DOWN}
      {2 RIGHT}DISPLAY TIME (1
      -59 SECONDS)";TL:IFTL<1O
      RTL>59THENTL=10
ER 70 FORI=1TOP:PRINT"{CLR}
      {DOWN}{2 RIGHT}{WHT}#
      {CYN}"I"{WHT}PICTURE NAM
      E";:INPUTF$(I)
GR 80 IFF$(I)=""ORLEN(F$(I))>1
      6THEN70
CH 90 PRINT"{DOWN}"TAB(13)"{6}
      PICTURE FORMAT?"
RM 100 PRINT"{2 DOWN}{3}":FORJ
       =1TO13:PRINTCHR$(64+J)"
       . "FO$(J):NEXT
MP 110 GETA$:IFA$=""THEN110
MR 120 K=ASC(A$):IFK<65ORK>77T
       HEN110
PF 130 T(I)=K-64:PRINT"{7}
       {DOWN} MESSAGE TO BE DI
       SPLAYED BEFORE VIEWING"
SK 140 INPUTM$(I)
EX 150 IFM$(I)=""THENM$(I)="NO
       W LOADING..."
BP 160 Z=Z+1:NEXT
EP 170 PRINT"{CLR}{DOWN}{H}"CH
       R$(142)TAB(14)"{YEL}U**
       {DOWN}{3 LEFT}-
       {2 SPACES}{WHT}UPER
       {DOWN}{7 LEFT}{YEL}J*I
       {DOWN}{LEFT}";
KR 180 PRINT"-{WHT}LIDESHOW
       {DOWN}{11 LEFT}{YEL}**K
       "
FJ 190 PRINTTAB(10)"{DOWN}
       {WHT}1. CREATE SLIDESHO
       W":PRINTTAB(10)"2. EDIT
        SLIDESHOW"
FA 200 PRINTTAB(10)"3. SAVE SL
       IDESHOW":PRINTTAB(10)"4
       . LOAD SLIDESHOW"
MR 210 PRINTTAB(10)"5. QUIT":P
       RINTTAB(10)"{DOWN}YOU H
       AVE"Z"PICTURES"
MA 220 PRINT"{3 DOWN}"TAB(10)"
       {CYN}MAKE SELECTION (1-
       5)"
BH 230 PRINT"{3 DOWN}"TAB(3)"
       {WHT}COPYRIGHT 1989 COM
       PUTE! PUBL., INC."
HX 240 PRINTTAB(11)"ALL RIGHTS
        RESERVED{CYN}"
HQ 250 GETA$:IFA$=""THEN250
JX 260 IFA$<"1"ORA$>"5"THEN250
XQ 270 ONVAL(A$)GOTO40,360,280
       ,460,510
SM 280 REM SAVE
FA 290 H$="":INPUT"{CLR}{WHT}
       {2 DOWN}{2 RIGHT}SAVE A
       S (FILENAME)";H$:IFH$="
       "THEN170
HQ 300 IFLEN(H$)>16THEN290
KM 310 OPEN15,8,15,"S0:"+H$:PR
       INT#15,"I0"
ES 320 OPEN1,8,2,"0:"+H$+",S,W
       ":GOSUB750
BC 330 PRINT#1,P:PRINT#1,TL
XQ 340 FORI=1TOP:PRINT#1,F$(I)
       :PRINT#1,T(I):PRINT#1,M
       $(I):NEXTI
SM 350 GOSUB750:CLOSE1:CLOSE15
       :GOTO170
MX 355 REM EDIT
RA 360 IFZ=0THEN170
JC 370 FORI=1TOP
JF 380 PRINT"{CLR}{WHT}{RIGHT}
       #"I:PRINT"{2 DOWN}PICTU
       RE NAME: "F$(I):PRINT"
       {2 DOWN}PIC FORMAT: "FO
       $(T(I))
DS 390 PRINT"{2 DOWN}MESSAGE":
       PRINTM$(I)
HM 400 PRINT"{4 DOWN}{YEL}1. C
       HANGE PICTURE NAME":PRI
       NT"2. CHANGE PICTURE FO
       RMAT"
QC 410 PRINT"3. CHANGE MESSAGE
       ":PRINT"4. NEXT":PRINT"
       5. QUIT"
EF 420 GETA$:IFA$=""THEN420
JE 430 IFVAL(A$)<1ORVAL(A$)>5T
       HEN420
MB 440 ONVAL(A$)GOTO560,600,62
       0,650,730
QQ 450 REM LOAD
QQ 460 H$="":INPUT"{CLR}{WHT}
       {2 DOWN}{2 RIGHT}LOAD (
       FILENAME)";H$:IFH$=""TH
       EN170
AM 470 IFLEN(H$)>16THEN460
FD 480 OPEN15,8,15:OPEN1,8,2,"
       0:"+H$+",S,R":GOSUB750:
       INPUT#1,P:INPUT#1,TL
GR 490 FORI=1TOP:INPUT#1,F$(I)
       :INPUT#1,T(I):INPUT#1,M
       $(I):NEXTI
SS 500 GOSUB750:CLOSE1:CLOSE15
       :Z=P:GOTO170
SF 510 REM QUIT
BX 520 PRINT"{CLR}{3 DOWN}"TAB
       (7)"{WHT}QUIT, ARE YOU
       {SPACE}SURE?{2 SPACES}(
       Y/N)"
GD 530 GETA$:IFA$="N"THEN170
RK 540 IFA$="Y"THENPRINT"{CLR}
       {I}":END
XH 550 GOTO530
FE 560 PRINT"{2 DOWN}{2 RIGHT}
       PICTURE NAME";:INPUTU$
AS 570 IFU$=""THEN380
QX 580 IFLEN(U$)>16THENPRINT"
       {4 UP}":GOTO560
AQ 590 F$(I)=U$:GOTO380
RD 600 T(I)=T(I)+1:IFT(I)=14TH
       ENT(I)=1
RQ 610 GOTO380
SS 620 PRINT"{2 DOWN}NEW MESSA
       GE":INPUTV$:IFV$=""THEN
       380
```

```
AK 630 IFLEN(V$)>40THENPRINT"
       {6 UP}":GOTO620
SA 640 M$(I)=V$:GOTO380
RM 650 NEXT
AA 660 PRINT"{CLR}{2 DOWN}"TAB
       (7)"CURRENT DISPLAY TIM
       E IS"TL
PD 670 PRINT"{2 DOWN}"TAB(7)"C
       HANGE TIME LIMIT?
       {3 SPACES}(Y/N)"
SA 680 GETA$:IFA$="N"THEN730
XR 690 IFA$<>"Y"THEN680
BM 700 PRINT"{CLR}{2 DOWN}
       {RIGHT}TIME LIMIT
       {2 SPACES}(1-59)";:INPU
       TLT:IFLT=.THEN730
SQ 710 IFLT>59THEN730
FS 720 TL=LT
GD 730 GOTO170
EQ 740 REM READ ERROR CHANNEL
HP 750 INPUT#15,EN,EM$,ET,ES:I
       FEN=0THENRETURN
CH 760 PRINT"{DOWN}DISK ERROR:
        {RVS}"STR$(EN)" "EM$ST
       R$(ET)" "STR$(ES)"
       {DOWN}"
RA 770 PRINTTAB(14)"PRESS ANY
       {SPACE}KEY"
KE 780 GETK$:IFK$=""THEN780
RH 790 CLOSE1:CLOSE15:GOTO170
GX 800 DATAKOALA,CREATE WITH G
       ARFIELD,DOODLE,PRINT SH
       OP SCREEN MAGIC,PAINT N
       OW!
XD 810 DATAART STUDIO,ADVANCED
        ART STUDIO,RAINBOW PAI
       NTER,PAINTBRUSH,VIDCOM
QK 820 DATAARTIST 64,BLAZING P
       ADDLES, LO RES
```

Program 2: Slideshow Player

```
FH 10 REM COPYRIGHT 1989 COMPU
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SK 20 IFPEEK(49168)<>96THENLOA
      D"SS.ML",8,1
DF 30 POKE52,68:POKE56,68:CLR:
      DIMS(13):POKE53280,.:POK
      E53281,.:GOSUB420:L=4980
      5
KC 40 N=49750:FORI=1TO13:READS
      (I):NEXTI:PRINT"{DOWN}(P
      RESS RETURN TO QUIT)
      {2 UP}"
EP 50 N$="":INPUT"FILENAME";N$
      :IFN$=""THENPRINT"{CLR}
      {I}":END
XJ 60 OPEN15,8,15:OPEN1,8,2,"0
      :"+N$+",S,R":GOSUB450
RQ 70 INPUT#1,P:INPUT#1,TL:DIM
      F$(P),T(P),M$(P)
DX 80 FORI=1TOP:INPUT#1,F$(I):
      INPUT#1,T(I):INPUT#1,M$(
      I):NEXTI:GOSUB450
XG 90 CLOSE1:GOSUB250
SR 100 FORI=1TOP:GOSUB420:B=IN
       T(40-LEN(M$(I)))/2:PRIN
       TTAB(B)M$(I)
KA 110 IFT(I)=13THEN170:REM SE
       Q FILE
DC 120 POKEL,96:IFT(I)=3ORT(I)
       =8THENPOKEL,92
RH 130 IFT(I)=9ORT(I)=10THENPO
       KEL,88
AD 140 SYS49152,F$(I),8:GOSUB4
       50
CG 150 POKE49269,16:IFT(I)=5TH
       ENPOKE49269,1
DP 160 GOTO210
SA 170 OPEN1,8,2,F$(I):W=24576
       :GOSUB450
BS 180 GET#1,A$:POKEW,ASC(A$+C
       HR$(0)):IFSTTHEN200
KH 190 W=W+1:GOTO180
SH 200 CLOSE1:POKEW,.
AE 210 PRINT"{CLR}":SYSS(T(I))
       :TI$="000000":POKE198,.
AD 220 GETA$:IF(A$="")AND(TI/6
       0<TL)THEN220
HD 230 SYSN:IFA$="Q"THENCLOSE1
       5:RUN
GR 240 NEXTI:GOTO100
PM 250 FORI=1TOP:E$=F$(I)
SX 260 ONT(I)GOSUB280,290,320,
       330,340,350,360,370,380
       ,390,400,410,330
KK 270 F$(I)=E$:NEXT:RETURN
AD 280 E$="?PIC ? "+E$+"*":RET
       URN
FE 290 Q$="":FORJ=1TOLEN(E$)
MR 300 R$=MID$(E$,J,1):R=ASC(R
       $):IFR>64THENR=R+32
BD 310 Q$=Q$+CHR$(R):NEXT:E$="
       [CRT?>"+Q$+"*":RETURN
FG 320 E$="DD"+E$:RETURN
DM 330 RETURN
QX 340 E$="PN."+E$:RETURN
GR 350 E$=E$+"{10 SPACES}":E$=
       LEFT$(E$,11)+"
       {2 SPACES}PIC":RETURN
BR 360 E$=E$+"{11 SPACES}":E$=
       LEFT$(E$,12)+"MPIC":RET
       URN
PD 370 E$="RP."+E$:RETURN
FB 380 E$="£"+E$:RETURN
GS 390 E$="B."+E$:RETURN
HA 400 E$="P-"+E$:RETURN
JS 410 E$="PI."+E$:RETURN
BE 420 PRINT"{CLR}{H}{WHT}
       {DOWN}{8}"CHR$(142)TAB(
       12)"SUPER{2 SPACES}SLID
       ESHOW"
KD 430 PRINTTAB(3)"{20 DOWN}CO
       PYRIGHT 1989 COMPUTE! P
       UBL., INC."
JG 440 PRINTTAB(11)"ALL RIGHTS
        RESERVED{WHT}{HOME}
       {10 DOWN}":RETURN
HQ 450 INPUT#15,EN,EM$,ET,ES:I
       FEN=0THENRETURN
JD 460 SYSN:PRINT"{DOWN}DISK E
       RROR: {RVS}"STR$(EN)" "
       EM$STR$(ET)" "STR$(ES)"
        "
QG 470 CLOSE1:CLOSE15:PRINT"
       {I}":END
GS 480 DATA49169,49215,49228,4
       9268,49268,49296,49315
CE 490 DATA49362,49426,49500,4
       9564,49632,49646
```

Program 3: Slideshow ML

See instructions in article on page 56 before typing in.

```
C000:20 FD AE 20 D4 E1 A2 00 5C
C008:AC 8D C2 A9 00 20 D5 FF 62
C010:60 A9 00 8D 20 D0 AD 10 B4
C018:87 8D 21 D0 20 16 C2 A2 73
C020:00 BD 28 83 9D 00 D8 BD AA
C028:28 84 9D 00 D9 BD 28 85 2E
C030:9D 00 DA BD 28 86 9D 00 4E
C038:DB E8 D0 E5 4C 3B C2 A9 D8
C040:02 8D 20 D0 A9 01 8D 21 C4
C048:D0 4C 1C C0 A9 00 8D 20 5D
C050:D0 8D 21 D0 A2 00 BD 00 5F
C058:5C 9D 00 44 BD 00 5D 9D F9
C060:00 45 BD 00 5E 9D 00 46 9A
C068:BD 00 5F 9D 00 47 E8 D0 4E
C070:E5 4C 48 C2 A9 10 8D 20 F5
C078:D0 8D 21 D0 A2 00 9D 00 47
C080:44 9D 00 45 9D 00 46 9D F6
C088:00 47 E8 D0 F1 4C 48 C2 1A
C090:A9 00 8D 20 D0 AD 28 83 AB
C098:8D 21 D0 A2 00 20 16 C2 DC
C0A0:4C 48 C2 AD 28 83 8D 20 18
C0A8:D0 AD 29 83 8D 21 D0 20 0E
C0B0:16 C2 A2 00 BD 38 83 9D B5
C0B8:00 D8 BD 38 84 9D 00 D9 20
C0C0:BD 38 85 9D 00 DA BD 38 D8
C0C8:86 9D 00 DB E8 D0 E5 4C 55
C0D0:3B C2 A9 00 8D 20 D0 8D F1
C0D8:21 D0 A2 00 BD 00 5C 9D B7
C0E0:00 44 BD 00 5D 9D 00 45 D1
C0E8:BD 00 5E 9D 00 46 BD 00 83
C0F0:5F 9D 00 47 BD 40 7F 9D 89
C0F8:00 D8 BD 40 80 9D 00 D9 C0
C100:BD 40 81 9D 00 DA BD 40 A3
C108:82 9D 00 DB E8 D0 CD 4C 64
C110:3B C2 AD 00 5F 20 34 C2 3E
C118:8D 20 D0 AD 01 5F 20 34 59
C120:C2 8D 21 D0 A2 00 BD 00 2A
C128:58 9D 00 44 BD 00 59 9D C1
C130:00 45 BD 00 5A 9D 00 46 4C
C138:BD 00 5B 9D 00 47 BD 00 78
C140:5C 9D 00 D8 BD 00 5D 9D 2D
C148:00 D9 BD 00 5E 9D 00 DA 3E
C150:BD 00 5F 9D 00 DB E8 D0 8A
C158:CD 4C 3B C2 A9 00 8D 20 F1
C160:D0 8D 21 D0 A2 00 BD 00 71
C168:58 9D 00 D8 BD 00 59 9D 4B
C170:00 D9 BD 00 5A 9D 00 DA 46
C178:BD 00 5B 9D 00 DB BD 00 0B
C180:5C 9D 00 44 BD 00 5D 9D 24
C188:00 45 BD 00 5E 9D 00 46 C4
C190:BD 00 5F 9D 00 47 E8 D0 78
C198:CD 4C 3B C2 AD FE 87 8D AF
C1A0:20 D0 AD FF 87 8D 21 D0 A3
C1A8:A2 00 BD 00 80 9D 00 44 F3
C1B0:BD 00 81 9D 00 45 BD 00 AD
C1B8:82 9D 00 46 BD 00 83 9D DB
C1C0:00 47 BD 00 84 9D 00 D8 41
C1C8:BD 00 85 9D 00 D9 BD 00 98
C1D0:86 9D 00 DA BD 00 87 9D 47
C1D8:00 DB E8 D0 CD 4C 3B C2 56
C1E0:A9 00 8D 20 D0 AD 80 7F AA
C1E8:8D 21 D0 4C AA C1 A9 00 0A
C1F0:8D 20 D0 8D 21 D0 A9 93 69
C1F8:20 D2 FF A9 00 85 FB A9 93
C200:60 85 FC A0 00 B1 FB F0 70
C208:0C 20 D2 FF E6 FB D0 F3 B2
C210:E6 FC 4C 03 C2 60 A2 00 DE
C218:BD 40 7F 9D 00 44 BD 40 23
C220:80 9D 00 45 BD 40 81 9D 31
C228:00 46 BD 40 82 9D 00 47 CC
C230:E8 D0 E5 60 29 F0 4A 4A 0D
C238:4A 4A 60 A9 D8 8D 16 D0 16
C240:A9 18 8D 18 D0 4C 4D C2 E8
C248:A9 1D 8D 18 D0 A9 3B 8D 4E
C250:11 D0 CE 00 DD 60 A9 1B 4B
C258:8D 11 D0 A9 C8 8D 16 D0 17
C260:A9 15 8D 18 D0 A9 C7 8D 7D
C268:00 DD A9 00 8D 20 D0 8D B6
C270:21 D0 A9 93 20 D2 FF 60 D5
C278:A9 00 85 C6 C8 8C 20 D0 79
C280:A2 C2 CA 05 FE 20 E4 FF F3
C288:F0 F2 85 02 60 00 00 00 17
```

Machine Language Programming

Article on page 70.

```
SH 10 FORI=8192TO8245:READA:X=
      X+A:POKEI,A:NEXTI
GR 20 IFX<>5294THENPRINT"DATA
      {SPACE}ERROR.":STOP
GM 30 POKE8247,1:POKE8248,89
HF 40 SYS8192:END
CC 50 DATA 169,13,72,162,16,16
      9
BS 60 DATA 0,24,141,54,32,46
FE 70 DATA 56,32,46,55,32,46
AC 80 DATA 54,32,202,48,11,173
GH 90 DATA 54,32,201,10,144,23
      7
CC 100 DATA 233,10,176,230,9,4
       8
KG 110 DATA 72,173,56,32,13,55
RD 120 DATA 32,208,214,104,32,
       210
MQ 130 DATA 255,201,48,176,248
       ,96
```

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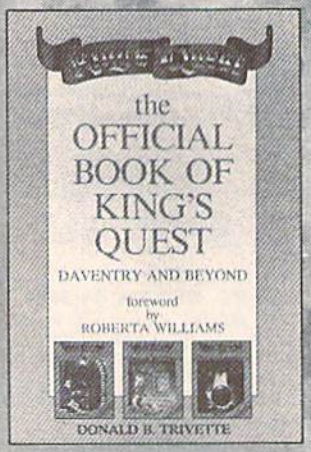

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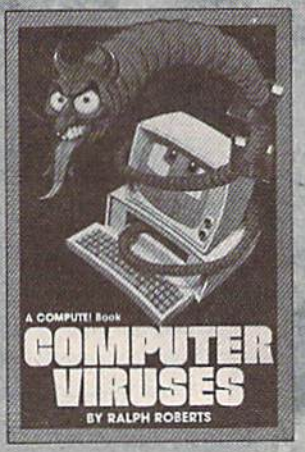

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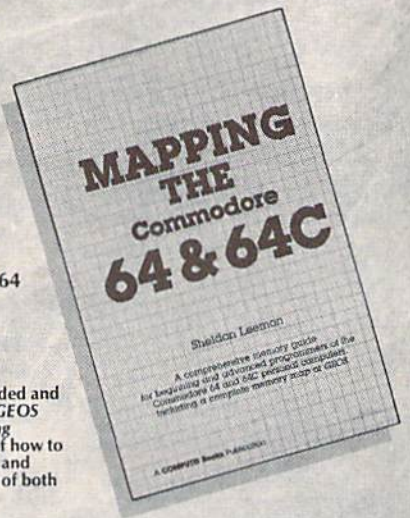

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MLX Machine Language Entry Program For Commodore 64 and 128

Ottis R. Cowper

"MLX" is a labor-saving utility that allows almost fail-safe entry of machine language programs. Included are versions for the Commodore 64 and 128.

Type in and save some copies of whichever version of MLX is appropriate for your computer (you'll want to use it to enter future ML programs from COMPUTE!'s GAZETTE). Program 1 is for the Commodore 64, and Program 2 is for the 128 (128 MLX can also be used to enter Commodore 64 ML programs for use in 64 mode). When you're ready to enter an ML program, load and run MLX. It asks you for a starting address and an ending address. These addresses appear in the article accompanying the MLX-format program listing you're typing.

If you're unfamiliar with machine language, the addresses (and all other values you enter in MLX) may appear strange. Instead of the usual decimal numbers you're accustomed to, these numbers are in *hexadecimal*—a base 16 numbering system commonly used by ML programmers. Hexadecimal—hex for short—includes the numerals 0–9 and the letters A–F. But don't worry—even if you know nothing about ML or hex, you should have no trouble using MLX.

After you enter the starting and ending addresses, you'll be offered the option of clearing the workspace. Choose this option if you're starting to enter a new listing. If you're continuing a listing that's partially typed from a previous session, don't choose this option.

A functions menu will appear. The first option in the menu is ENTER DATA. If you're just starting to type in a program, pick this. Press the E key, and type the first number in the first line of the program listing. If you've already typed in part of a program, type the line number where you left off typing at the end of the previous session (be sure to load the partially completed program before you resume entry). In any case, make sure the address you enter corresponds to the address of a line in the listing you are entering. Otherwise, you'll be unable to enter the data correctly. If you pressed E by mistake, you can return to the command menu by pressing RETURN alone when asked for the address. (You can get back to the menu from most options by pressing RETURN with no other input.)

Entering A Listing

Once you're in Enter mode, MLX prints the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight data bytes and a checksum. Although an MLX-format listing appears similar to the "hex dump" listings from a machine language monitor program, the extra checksum number on the end allows MLX to check your typing. (Commodore 128 users *can* enter the data from an MLX listing using the built-in monitor if the rightmost column of data is omitted, but we recommend against it. It's much easier to let MLX do the proofreading and error checking for you.)

When you enter a line, MLX recalculates the checksum from the eight bytes and the address and compares this value to the number from the ninth column. If the values match, you'll hear a bell tone, the data will be added to the workspace area, and the prompt for the next line of data will appear. But if MLX detects a typing error, you'll hear a low buzz and see an error message. The line will then be redisplayed for editing.

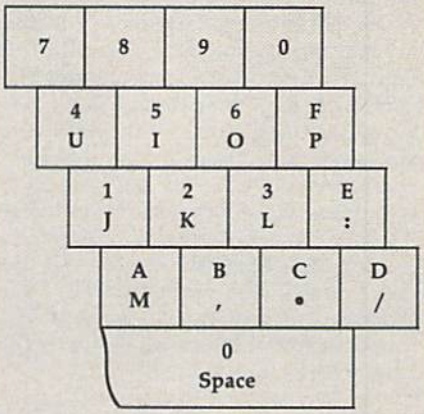
Invalid Characters Banned

Only a few keys are active while you're entering data, so you may have to unlearn some habits. You *do not* type spaces between the columns; MLX automatically inserts these for you. You *do not* press RETURN after typing the last number in a line; MLX automatically enters and checks the line after you type the last digit.

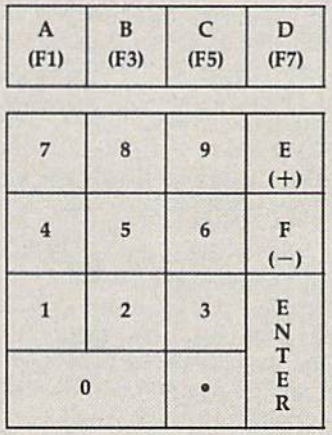
Only the numerals 0–9 and the letters A–F can be typed in. If you press any other key (with some exceptions noted below), you'll hear a warning buzz. To simplify typing, 128 MLX redefines the function keys and + and − keys on the numeric keypad so that you can enter data one-handed. (The 64 version incorporates the keypad modification from the March 1986 "Bug-Swatter" column, lines 485–487.) In either case, the keypad is active only while entering data. Addresses must be entered with the normal letter and number keys. The figures above show the keypad configurations for each version.

MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, MLX will catch your mistake. There is one error that can slip past MLX: Because of the checksum formula used, MLX won't notice if you accidentally type FF in place of 00, and vice versa. And there's a very slim chance that you could garble a line and still end up with a combination of characters that adds up to the proper checksum. However, these mistakes should not occur if you take reasonable care while entering data.

64 MLX Keypad



128 MLX Keypad



Editing Features

To correct typing mistakes before finishing a line, use the INST/DEL key to delete the character to the left of the cursor. (The cursor-left key also deletes.) If you mess up a line really badly, press CLR/HOME to start the line over. The RETURN key is also active, but only before any data is typed on a line. Pressing RETURN at this point returns you to the command menu. After you type a character of data, MLX disables RETURN until the cursor returns to the start of a line. Remember, you can press CLR/HOME to quickly get to a line

number prompt.

More editing features are available when correcting lines in which MLX has detected an error. To make corrections in a line that MLX has redisplayed for editing, compare the line on the screen with the one printed in the listing, then move the cursor to the mistake and type the correct key. The cursor left and right keys provide the normal cursor controls. (The INST/DEL key now works as an alternative cursor-left key.) You cannot move left beyond the first character in the line. If you try to move beyond the rightmost character, you'll reenter the line. During editing, RETURN is active; pressing it tells MLX to recheck the line. You can press the CLR/HOME key to clear the entire line if you want to start from scratch, or if you want to get to a line number prompt to use RETURN to get back to the menu.

Display Data

The second menu choice, DISPLAY DATA, examines memory and shows the contents in the same format as the program listing (including the checksum). When you press D, MLX asks you for a starting address. Be sure that the starting address you give corresponds to a line number in the listing. Otherwise, the checksum display will be meaningless. MLX displays program lines until it reaches the end of the program, at which point the menu is redisplayed. You can pause the display by pressing the space bar. (MLX finishes printing the current line before halting.) Press space again to restart the display. To break out of the display and get back to the menu before the ending address is reached, press RETURN.

Other Menu Options

Two more menu selections let you save programs and load them back into the computer. These are SAVE FILE and LOAD FILE; their operation is quite straightforward. When you press S or L, MLX asks you for the filename. You'll then be asked to press either D or T to select disk or tape.

You'll notice the disk drive starting and stopping several times during a load or save (save only for the 128 version). Don't panic; this is normal behavior. MLX opens and reads from or writes to the file instead of using the usual LOAD and SAVE commands (128 MLX makes use of BLOAD). Disk users should also note that the drive prefix 0: is automatically added to the filename (line 750 in 64 MLX), so this should *not* be included when entering the name. This also precludes the use of @ for Save-with-Replace, so remember to give each version you save a different name. The 128 version makes up for this by giving you the option of scratching the existing file if you want to reuse a filename.

Remember that MLX saves the entire workspace area from the starting address to the ending address, so the save or load may take longer than you might expect if you've entered only a small amount of data from a long listing. When saving a partially completed listing, make sure to note the address where you stopped typing so you'll know where to resume entry when you reload.

MLX reports the standard disk or tape error messages if any problems are detected during the save or load. (Tape users should bear in mind that Commodore computers are never able to detect errors during a save to tape.) MLX also has three special load error messages: INCORRECT STARTING ADDRESS, which means the file you're trying to load does not have the starting address you specified when you ran MLX; LOAD ENDED AT *address*, which means the file you're trying to load ends before the ending address you specified when you started MLX; and TRUNCATED AT ENDING ADDRESS, which means the file you're trying to load extends beyond the ending address you specified when you started MLX. If you see one of these messages and feel certain that you've loaded the right file, exit and rerun MLX, being careful to enter the correct starting and ending addresses.

The 128 version also has a CATALOG DISK option so you can view the contents of the disk directory before saving or loading.

The QUIT menu option has the obvious effect—it stops MLX and enters BASIC. The RUN/STOP key is disabled, so the Q option lets you exit the program without turning off the computer. (Of course, RUN/STOP-RESTORE also gets you out.) You'll be asked for verification; press Y to exit to BASIC, or any other key to return to the menu. After quitting, you can type RUN again and reenter MLX without losing your data, as long as you don't use the clear workspace option.

The Finished Product

When you've finished typing all the data for an ML program and saved your work, you're ready to see the results. The instructions for loading and using the finished product vary from program to program. Some ML programs are designed to be loaded and run like BASIC programs, so all you need to type is LOAD *"filename"*,8 for disk (DLOAD *"filename"* on the 128) or LOAD *"filename"*,1 for tape, and then RUN. Such programs will usually have a starting address of 0801 for the 64 or 1C01 for the 128. Other programs must be reloaded to specific addresses with a command such as LOAD *"filename"*,8,1 for disk (BLOAD *"filename"* on the 128) or LOAD *"filename"*,1,1 for tape, then started with a SYS to a particular memory address. On the Commodore 64, the most common starting address for such programs is 49152, which corresponds to MLX address C000. In either case, you should always refer to the article which accompanies the ML listing for information on loading and running the program.

An Ounce Of Prevention

By the time you finish typing in the data for a long ML program, you may have several hours invested in the project. Don't take chances—use our "Automatic Proofreader" to type the new MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses, then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load options several times to ensure that you can recall your work from disk or tape. Don't let a simple typing error in the new MLX cost you several nights of hard work.

Program 1: MLX For Commodore 64

```
SS 10 REM VERSION 1.1: LINES 8
      30,950 MODIFIED, LINES 4
      85-487 ADDED
EK 100 POKE 56,50:CLR:DIM IN$,
      I,J,A,B,A$,B$,A(7),N$
DM 110 C4=48:C6=16:C7=7:Z2=2:Z
      4=254:Z5=255:Z6=256:Z7=
      127
CJ 120 FA=PEEK(45)+Z6*PEEK(46)
      :BS=PEEK(55)+Z6*PEEK(56
      ):H$="0123456789ABCDEF"
SB 130 R$=CHR$(13):L$="{LEFT}"
      :S$=" ":D$=CHR$(20):Z$=
      CHR$(0):T$="{13 RIGHT}"
CQ 140 SD=54272:FOR I=SD TO SD
      +23:POKE I,0:NEXT:POKE
      {SPACE}SD+24,15:POKE 78
      8,52
FC 150 PRINT"{CLR}"CHR$(142)CH
      R$(8):POKE 53280,15:POK
      E 53281,15
EJ 160 PRINT T$" {RED}{RVS}
      {2 SPACES}{8 @}
      {2 SPACES}"SPC(28)"
      {2 SPACES}{OFF}{BLU} ML
      X II {RED}{RVS}
      {2 SPACES}"SPC(28)"
      {12 SPACES}{BLU}"
FR 170 PRINT"{3 DOWN}
      {3 SPACES}COMPUTE!'S MA
      CHINE LANGUAGE EDITOR
      {3 DOWN}"
JB 180 PRINT"{BLK}STARTING ADD
```

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1541 RAMBOard*

Byte The Copy Protection bullet!

Let's face it - war is hell. And in the Commodore world, one of the ugliest wars of all is being waged by the copy protection industry. They're tough. They're clever. And they're very, very determined. If you've seen some of the current ice out there, you know just how determined they are. Well, we're just as determined. And we've got a way to walk right through the coldest ice out there.

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Get your RAMBOard today. And the next time some company tries to charge you for an "authorized" backup of a program you've already paid for, remind them that war IS hell - and you know how to raise a little hell of your own.

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NEW V2.0

A New Tool-From Some Old Friends

You know us. When copy protection began throwing 1541 drive heads out of alignment, we gave you Kracker Jax. When V-Max reared its ugly head, we created the Kracker Jax Elite series. When the copy protection wars escalated, we responded with Bull's-Eye and the Hacker's Utility Kit. And when you decided to explore the mysteries of commercial-grade protection schemes, we were there with Kracker Jax Revealed.

Now the copy protection industry has upped the ante again. They've made it harder than ever to make legitimate backups of your expensive software. Do you think you should have to spend money to buy "authorized" backups of software that you already own?

Neither do we.

Introducing Maverick, the best weapon we've ever made to let you defend yourself from copy protection profiteering. Maverick is so advanced, it has actually replaced every other backup utility we've ever created. That's right - Maverick is now the ONLY archival software we manufacture. All of our R&D efforts go into making sure that Maverick remains the most powerful backup utility available - from ANY source! Take a look at some of these features:

- NEW — 1541 1571 1581 fast file copier - any direction
- GCR Editor for the experienced hacker
- NEW — GEOS file copier - works under desktop
- Error scanner with unique sector editor
- Directory editor helps you organize your disks
- Works with C-64 C-128 & 1541 1571 1581 drives
- Scrolling M.L monitor with Drive Mon
- EXLUSIVE Popular subscriber service available
- Single or dual state of the art Nibbler
- 300 + parameters for those tough to backup disks
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- Single of dual drive high speed data copier
- EXCLUSIVE GEOS Module: PARAMETERS & TOOLS
- NEW — Dump a formatted parameter catalog to printer
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- Technical support from our staff experts.

And this is just the beginning. Our future plans for Maverick include expanded RAMBOard support, RAM expansion module support, and even a 1541 1571 1581 relative file copier! And with our unique Subscriber Program, you can receive Maverick updates automatically - the instant they're released!

You know us. We're the company that has worked hard for years to establish an ironclad reputation for dynamic products, fair prices, and superb customer support. We've always been a part of your past. And as long as you have your Commodore, we'll always be a part of your future.

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Now Includes Parameter Modules 1, 2, & 3!

***Maverick Was Formerly Known As "Renegade" From Kracker Jax Not To Be Confused With The Game Of The Same Name**

THE 1581 TOOLKIT

Without It, You Don't Know What You 1581 Is Capable Of

It blew people away at the "World Of Commodore Show" held in Pennsylvania in November 1988. It's power and scope astonish anyone who sees it work. And, if you have a 1581 drive, it is the single most important piece of software that you can own. It is The 1581 Toolkit-and it will transform your 1581 into something remarkable.

We know the market, and we know that if you've bought any other 1581 utility in the past, you've probably been disappointed. But while other companies rushed ill-conceived and poorly executed products to market to "cash in" on the new 1581 drive, we did things differently. Our programmers took the time to become experts on the 1581 before they even looked at a drawing board. So when they finished the Toolkit project a full year later, they had accomplished what no one else had - the creation of a tight, integrated package of essential utilities that make the 1581 more than the sum of its parts. Take a look at these Toolkit utilities and see why we're so excited about it:

- Fast Disk Copier
- Directory Editor
- File Track & Sector Tracer
- Fast File Copier
- Byte Pattern Search
- Ultrafast Formatter
- Partition Creator
- Track & Sector Editor
- Error Scanner
- Relocatable Fast Loader

All 10 of these custom utilities use extremely fast read/write routines. Wherever appropriate, they allow full access to partitions. It's obvious we created The 1581 Toolkit to be the finest set of utilities available for the 1581 drive. But we didn't stop there. Order now, and we'll also send you the 1581 DOS Reference Guide FREE! With over 100 pages of concise, valuable information, you'll quickly find this book indispensable! Written by David Martin (INFO Magazine's Copy Corner reviewer), this manual represents a year's worth of research and investigation into the inner workings of the 1581 drive. We've also added extra utilities, including such handy items as a machine language monitor with DriveMon, the perfect companion for the 1581 DOS Reference Guide.

We've spent a lot of time working hard to make sure that nobody knows more about the 1581 than we do. Don't sell your 1581 short. Get the 1581 Toolkit today, and let us show you just what it's really capable of. We'll take your 1581 absolutely as far as it was designed to go. And then we'll take it farther.

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Your Last Chance To Own A Classic.

All good things must come to an end. That's true for everything, including software. The time has come to say goodbye to an old friend - SYSRES, the finest BASIC enchancement system ever created for th Commodore computer.

Software Support owns the exclusive rights to produce SYSRES. Reluctantly, we've decided to stop producing this incredible program. Why? The simple fact is that most of the serious BASIC programmers out there already own SYSRES, and there aren't enough new BASIC programmers entering the arena to warrant the expense of continued production of SYSRES.

If you're one of the few serious BASIC programmers out there who isn't yet using SYSRES, maybe you should take a look at some of these features:

- Easy code entry with features like auto line numbering, enhanced key repeat, and fast up and down scrolling of program listings!
- Macros; any shifted key may be set to represent any BASIC or SYSRES KEYWORD. All files may be listed, loaded, run, copied, or scratched by entering a two character command in front of the file name listed in the directory!
- Find/Change any variable phrase or keyword used anywhere in your program. Over 700 search variations are available including pattern matching with wild cards and limitation symbols. Now you can automatically remove spaces and REMS to streamline run-time versions of your programs!
- List BASIC programs and relative and sequential files without loading them into memory first!
- Edit text files and assembler source code without having to leave BASIC!
- Do a partial renumber. Move a subroutine to a more logical starting place while preserving all other line numbers and updating all line references!
- Debug with a variable speed TRACE. Display the current and the five previous operations. Display variables as they change or are defined; send the TRACE to the printer!

We haven't even scratched the surface of SYSRES. With features like screen print, multiple drive support, full printer support, and program merge capabilities, it's easy to see why SYSRES is the most comprehensive BASIC programmers' aid package ever produced. And just as comprehensive is the professional documentation: over 110 pages, bound in an attractive three ring binder. You'll also be pleased to know that SYSRES is UNprotected!

So there you have it. If you use BASIC at all, this is the enhancement system that you need. And this is absolutely your last chance to own this classic. As a going away present, we've even cut the price in half! Now there's no reason for you to limp by on plain vanilla BASIC any more. Get SYSRES today - and get involved with some serious programming power!

SYSRES/NOW ONLY $19.95

While Limited Supplies Last!

ATTENTION C-128 OWNERS

Solderless 64K Video RAM Upgrade

Now that Commodore has released the C-128D with 64K of video RAM, we should be seeing 128 programs address this fantastic new feature soon.

BASIC 8 already has the capability of using all 64K of video RAM. If you own the C-128 in stock condition, you own all 16K of video RAM that Commodore felt was necessary. Using Basic 8 format and the full 64K of video RAM provides you with the ability to scroll through video memory as well as enhanced color resolution.

Up until now, to upgrade the C-128 to 64K of video RAM you would have to first search out the components, then find a competent repair outlet to desolder and install the parts. **What a hassle!**

SOLUTION — We have developed a module that simply plugs in to the mother board of your C-128. **No splattered solder — No heat damage — No hassle.**

This package is available in two different forms. Model A has all parts necessary to complete your upgrade, and Model B is identical except that you supply the RAMs. Again, no soldering is necessary. If you have access to low cost RAMs, we suggest Model B.

Both models include easy to follow installation instructions, a test program to verify proper installation, and the plug in Video RAM Upgrade.

Model A (complete) only $49.95

Model B (no RAMs) only $29.95

FLASH! Kracker Jax Earns a 5 Star Rating In INFO's May-June '88 Issue

Kracker Jax is the powerful parameter based copying system that has taken the country by storm! What IS a parameter? It's a custom program that allows your 1541 or 1571 disk drive to strip ALL copy protection from your expensive software, leaving you with UNPROTECTED, TOTALLY BROKEN BACKUPS that can even be copied with a simple fast copier!

We declare **Kracker Jax** to be the best system of its kind on the market today! A bold claim? Maybe.

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Serious Commodore Users know why the Revealed Books by Kracker Jax are the last word in Commodore copy de-protection information. Our Knowledge of protection schemes has made us famous. Now find out how we do what we do best. Our books are your key to real knowledge. OTHERS ONLY SCRATCH THE SURFACE. We dig deep, much deeper. Not for the novice user, Kracker Jax Revealed Volume III takes you deep into the 1541 disk drive, where today's copy protection resides. If you have read and mustered the techniques set forth in Revealed I and II, you're ready for the next step - Kracker Jax Revealed III. Included as a free bonus is The Hacker's Utility Kit, one of the finest set of disk utilities gathered together in one package.

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```
      RESS[4]";:GOSUB300:SA=A
      D:GOSUB1040:IF F THEN18
      0
GF 190 PRINT"{BLK}{2 SPACES}EN
      DING ADDRESS[4]";:GOSUB
      300:EA=AD:GOSUB1030:IF
      {SPACE}F THEN190
KR 200 INPUT"{3 DOWN}{BLK}CLEA
      R WORKSPACE [Y/N][4]";A
      $:IF LEFT$(A$,1)<>"Y"TH
      EN220
PG 210 PRINT"{2 DOWN}{BLU}WORK
      ING...";:FORI=BS TO BS+
      EA-SA+7:POKE I,0:NEXT:P
      RINT"DONE"
DR 220 PRINTTAB(10)"{2 DOWN}
      {BLK}{RVS} MLX COMMAND
      {SPACE}MENU {DOWN}[4]":
      PRINT T$"{RVS}E{OFF}NTE
      R DATA"
BD 230 PRINT T$"{RVS}D{OFF}ISP
      LAY DATA":PRINT T$"
      {RVS}L{OFF}OAD FILE"
JS 240 PRINT T$"{RVS}S{OFF}AVE
       FILE":PRINT T$"{RVS}Q
      {OFF}UIT{2 DOWN}{BLK}"
JH 250 GET A$:IF A$=N$ THEN250
HK 260 A=0:FOR I=1 TO 5:IF A$=
      MID$("EDLSQ",I,1)THEN A
      =I:I=5
FD 270 NEXT:ON A GOTO420,610,6
      90,700,280:GOSUB1060:GO
      TO250
EJ 280 PRINT"{RVS} QUIT ":INPU
      T"{DOWN}[4]ARE YOU SURE
       [Y/N]";A$:IF LEFT$(A$,
      1)<>"Y"THEN220
EM 290 POKE SD+24,0:END
JX 300 IN$=N$:AD=0:INPUTIN$:IF
      LEN(IN$)<>4THENRETURN
KF 310 B$=IN$:GOSUB320:AD=A:B$
      =MID$(IN$,3):GOSUB320:A
      D=AD*256+A:RETURN
PP 320 A=0:FOR J=1 TO 2:A$=MID
      $(B$,J,1):B=ASC(A$)-C4+
      (A$>"@")*C7:A=A*C6+B
JA 330 IF B<0 OR B>15 THEN AD=
      0:A=-1:J=2
GX 340 NEXT:RETURN
CH 350 B=INT(A/C6):PRINT MID$(
      H$,B+1,1);:B=A-B*C6:PRI
      NT MID$(H$,B+1,1);:RETU
      RN
RR 360 A=INT(AD/Z6):GOSUB350:A
      =AD-A*Z6:GOSUB350:PRINT
      ":";
BE 370 CK=INT(AD/Z6):CK=AD-Z4*
      CK+Z5*(CK>Z7):GOTO390
PX 380 CK=CK*Z2+Z5*(CK>Z7)+A
JC 390 CK=CK+Z5*(CK>Z5):RETURN
QS 400 PRINT"{DOWN}STARTING AT
      [4]";:GOSUB300:IF IN$<>
      N$ THEN GOSUB1030:IF F
      {SPACE}THEN400
EX 410 RETURN
HD 420 PRINT"{RVS} ENTER DATA
      {SPACE}":GOSUB400:IF IN
      $=N$ THEN220
JK 430 OPEN3,3:PRINT
SK 440 POKE198,0:GOSUB360:IF F
       THEN PRINT IN$:PRINT"
      {UP}{5 RIGHT}";
GC 450 FOR I=0 TO 24 STEP 3:B$
      =S$:FOR J=1 TO 2:IF F T
      HEN B$=MID$(IN$,I+J,1)
HA 460 PRINT"{RVS}"B$L$;:IF I<
      24THEN PRINT"{OFF}";
HD 470 GET A$:IF A$=N$ THEN470
FK 480 IF(A$>"/"ANDA$<":")OR(A
      $>"@"ANDA$<"G")THEN540
GS 485 A=-(A$="M")-2*(A$=",")-
      3*(A$=".")-4*(A$="/")-5
      *(A$="J")-6*(A$="K")
FX 486 A=A-7*(A$="L")-8*(A$=":
      ")-9*(A$="U")-10*(A$="I
      ")-11*(A$="O")-12*(A$="
      P")
CM 487 A=A-13*(A$=S$):IF A THE
      N A$=MID$("ABCD123E456F
      0",A,1):GOTO 540
MP 490 IF A$=R$ AND((I=0)AND(J
      =1)OR F)THEN PRINT B$;:
      J=2:NEXT:I=24:GOTO550
KC 500 IF A$="{HOME}" THEN PRI
      NT B$:J=2:NEXT:I=24:NEX
      T:F=0:GOTO440
MX 510 IF(A$="{RIGHT}")ANDF TH
      ENPRINT B$L$;:GOTO540
GK 520 IF A$<>L$ AND A$<>D$ OR
      ((I=0)AND(J=1))THEN GOS
      UB1060:GOTO470
HG 530 A$=L$+S$+L$:PRINT B$L$;
      :J=2-J:IF J THEN PRINT
      {SPACE}L$;:I=I-3
QS 540 PRINT A$;:NEXT J:PRINT
      {SPACE}S$;
PM 550 NEXT I:PRINT:PRINT"{UP}
      {5 RIGHT}";:INPUT#3,IN$
      :IF IN$=N$ THEN CLOSE3:
      GOTO220
QC 560 FOR I=1 TO 25 STEP3:B$=
      MID$(IN$,I):GOSUB320:IF
       I<25 THEN GOSUB380:A(I
      /3)=A
PK 570 NEXT:IF A<>CK THEN GOSU
      B1060:PRINT"{BLK}{RVS}
      {SPACE}ERROR: REENTER L
      INE [4]":F=1:GOTO440
HJ 580 GOSUB1080:B=BS+AD-SA:FO
      R I=0 TO 7:POKE B+I,A(I
      ):NEXT
QQ 590 AD=AD+8:IF AD>EA THEN C
      LOSE3:PRINT"{DOWN}{BLU}
      ** END OF ENTRY **{BLK}
      {2 DOWN}":GOTO700
GQ 600 F=0:GOTO440
QA 610 PRINT"{CLR}{DOWN}{RVS}
      {SPACE}DISPLAY DATA ":G
      OSUB400:IF IN$=N$ THEN2
      20
RJ 620 PRINT"{DOWN}{BLU}PRESS:
       {RVS}SPACE{OFF} TO PAU
      SE, {RVS}RETURN{OFF} TO
       BREAK[4]{DOWN}"
KS 630 GOSUB360:B=BS+AD-SA:FOR
      I=BTO B+7:A=PEEK(I):GOS
      UB350:GOSUB380:PRINT S$
      ;
CC 640 NEXT:PRINT"{RVS}";:A=CK
      :GOSUB350:PRINT
KH 650 F=1:AD=AD+8:IF AD>EA TH
      ENPRINT"{DOWN}{BLU}** E
      ND OF DATA **":GOTO220
KC 660 GET A$:IF A$=R$ THEN GO
      SUB1080:GOTO220
EQ 670 IF A$=S$ THEN F=F+1:GOS
      UB1080
AD 680 ONFGOTO630,660,630
CM 690 PRINT"{DOWN}{RVS} LOAD
      {SPACE}DATA ":OP=1:GOTO
      710
PC 700 PRINT"{DOWN}{RVS} SAVE
      {SPACE}FILE ":OP=0
RX 710 IN$=N$:INPUT"{DOWN}FILE
      NAME[4]";IN$:IF IN$=N$
      {SPACE}THEN220
PR 720 F=0:PRINT"{DOWN}{BLK}
      {RVS}T{OFF}APE OR {RVS}
      D{OFF}ISK: [4]";
FP 730 GET A$:IF A$="T"THEN PR
      INT"T{DOWN}":GOTO880
HQ 740 IF A$<>"D"THEN730
HH 750 PRINT"D{DOWN}":OPEN15,8
      ,15,"I0:":B=EA-SA:IN$="
      0:"+IN$:IF OP THEN810
SQ 760 OPEN 1,8,8,IN$+",P,W":G
      OSUB860:IF A THEN220
FJ 770 AH=INT(SA/256):AL=SA-(A
      H*256):PRINT#1,CHR$(AL)
      ;CHR$(AH);
PE 780 FOR I=0 TO B:PRINT#1,CH
      R$(PEEK(BS+I));:IF ST T
      HEN800
FC 790 NEXT:CLOSE1:CLOSE15:GOT
      O940
GS 800 GOSUB1060:PRINT"{DOWN}
      {BLK}ERROR DURING SAVE:
      [4]":GOSUB860:GOTO220
MA 810 OPEN 1,8,8,IN$+",P,R":G
      OSUB860:IF A THEN220
GE 820 GET#1,A$,B$:AD=ASC(A$+Z
      $)+256*ASC(B$+Z$):IF AD
      <>SA THEN F=1:GOTO850
RX 830 FOR I=0 TO B:GET#1,A$:P
      OKE BS+I,ASC(A$+Z$):IF(
      I<>B)AND ST THEN F=2:AD
      =I:I=B
FA 840 NEXT:IF ST<>64 THEN F=3
FQ 850 CLOSE1:CLOSE15:ON ABS(F
      >0)+1 GOTO960,970
SA 860 INPUT#15,A,A$:IF A THEN
       CLOSE1:CLOSE15:GOSUB10
      60:PRINT"{RVS}ERROR: "A
      $
GQ 870 RETURN
EJ 880 POKE183,PEEK(FA+2):POKE
      187,PEEK(FA+3):POKE188,
      PEEK(FA+4):IFOP=0THEN92
      0
HJ 890 SYS 63466:IF(PEEK(783)A
      ND1)THEN GOSUB1060:PRIN
      T"{DOWN}{RVS} FILE NOT
      {SPACE}FOUND ":GOTO690
CS 900 AD=PEEK(829)+256*PEEK(8
      30):IF AD<>SA THEN F=1:
      GOTO970
SC 910 A=PEEK(831)+256*PEEK(83
      2)-1:F=F-2*(A<EA)-3*(A>
      EA):AD=A-AD:GOTO930
KM 920 A=SA:B=EA+1:GOSUB1010:P
      OKE780,3:SYS 63338
JF 930 A=BS:B=BS+(EA-SA)+1:GOS
      UB1010:ON OP GOTO950:SY
      S 63591
AE 940 GOSUB1080:PRINT"{BLU}**
       SAVE COMPLETED **":GOT
      O220
XP 950 POKE147,0:SYS 63562:IF
      {SPACE}ST>0 THEN970
FR 960 GOSUB1080:PRINT"{BLU}**
       LOAD COMPLETED **":GOT
      O220
DP 970 GOSUB1060:PRINT"{BLK}
      {RVS}ERROR DURING LOAD:
      {DOWN}[4]":ON F GOSUB98
      0,990,1000:GOTO220
PP 980 PRINT"INCORRECT STARTIN
      G ADDRESS (";:GOSUB360:
      PRINT")":RETURN
GR 990 PRINT"LOAD ENDED AT ";:
      AD=SA+AD:GOSUB360:PRINT
       D$:RETURN
FD 1000 PRINT"TRUNCATED AT END
      ING ADDRESS":RETURN
RX 1010 AH=INT(A/256):AL=A-(AH
      *256):POKE193,AL:POKE1
      94,AH
FF 1020 AH=INT(B/256):AL=B-(AH
      *256):POKE174,AL:POKE1
      75,AH:RETURN
FX 1030 IF AD<SA OR AD>EA THEN
      1050
HA 1040 IF(AD>511 AND AD<40960
```

```
        )OR(AD>49151 AND AD<53
        248)THEN GOSUB1080:F=0
        :RETURN
HC 1050 GOSUB1060:PRINT"{RVS}
        {SPACE}INVALID ADDRESS
         {DOWN}{BLK}":F=1:RETU
        RN
AR 1060 POKE SD+5,31:POKE SD+6
        ,208:POKE SD,240:POKE
        {SPACE}SD+1,4:POKE SD+
        4,33
DX 1070 FOR S=1 TO 100:NEXT:GO
        TO1090
PF 1080 POKE SD+5,8:POKE SD+6,
        240:POKE SD,0:POKE SD+
        1,90:POKE SD+4,17
AC 1090 FOR S=1 TO 100:NEXT:PO
        KE SD+4,0:POKE SD,0:PO
        KE SD+1,0:RETURN
```

Program 2: MLX For Commodore 128

```
AE 100 TRAP 960:POKE 4627,128:
       DIM NL$,A(7)
XP 110 Z2=2:Z4=254:Z5=255:Z6=2
       56:Z7=127:BS=256*PEEK(4
       627):EA=65280
FB 120 BE$=CHR$(7):RT$=CHR$(13
       ):DL$=CHR$(20):SP$=CHR$
       (32):LF$=CHR$(157)
KE 130 DEF FNHB(A)=INT(A/256):
       DEF FNLB(A)=A-FNHB(A)*2
       56:DEF FNAD(A)=PEEK(A)+
       256*PEEK(A+1)
JB 140 KEY 1,"A":KEY 3,"B":KEY
        5,"C":KEY 7,"D":VOL 15
       :IF RGR(0)=5 THEN FAST
FJ 150 PRINT"{CLR}"CHR$(142);C
       HR$(8):COLOR 0,15:COLOR
        4,15:COLOR 6,15
GQ 160 PRINT TAB(12)"{RED}
       {RVS}{2 SPACES}{9 @}
       {2 SPACES}"RT$;TAB(12)"
       {RVS}{2 SPACES}{OFF}
       {BLU} 128 MLX {RED}
       {RVS}{2 SPACES}"RT$;TAB
       (12)"{RVS}{13 SPACES}
       {BLU}"
FE 170 PRINT"{2 DOWN}
       {3 SPACES}COMPUTE!'S MA
       CHINE LANGUAGE EDITOR
       {2 DOWN}"
DK 180 PRINT"{BLK}STARTING ADD
       RESS{4}";:GOSUB 260:IF
       {SPACE}AD THEN SA=AD:EL
       SE 180
FH 190 PRINT"{BLK}{2 SPACES}EN
       DING ADDRESS{4}";:GOSUB
        260:IF AD THEN EA=AD:E
       LSE 190
MF 200 PRINT"{DOWN}{BLK}CLEAR
       {SPACE}WORKSPACE [Y/N]?
       {4}":GETKEY A$:IF A$<>"
       Y" THEN 220
QH 210 PRINT"{DOWN}{BLU}WORKIN
       G...";:BANK 0:FOR A=BS
       {SPACE}TO BS+(EA-SA)+7:
       POKE A,0:NEXT A:PRINT"D
       ONE"
DC 220 PRINT TAB(10)"{DOWN}
       {BLK}{RVS} MLX COMMAND
       {SPACE}MENU {4}{DOWN}":
       PRINT TAB(13)"{RVS}E
       {OFF}NTER DATA"RT$;TAB(
       13)"{RVS}D{OFF}ISPLAY D
       ATA"RT$;TAB(13)"{RVS}L
       {OFF}OAD FILE"
HB 230 PRINT TAB(13)"{RVS}S
       {OFF}AVE FILE"RT$;TAB(1
       3)"{RVS}C{OFF}ATALOG DI
       SK"RT$;TAB(13)"{RVS}Q
       {OFF}UIT{DOWN}{BLK}"
AP 240 GETKEY A$:A=INSTR("EDLS
       CQ",A$):ON A GOTO 340,5
       50,640,650,930,940:GOSU
       B 950:GOTO 240
SX 250 PRINT"STARTING AT";:GOS
       UB 260:IF(AD<>0)OR(A$=N
       L$)THEN RETURN:ELSE 250
BG 260 A$=NL$:INPUT A$:IF LEN(
       A$)=4 THEN AD=DEC(A$)
PP 270 IF AD=0 THEN BEGIN:IF A
       $<>NL$ THEN 300:ELSE RE
       TURN:BEND
MA 280 IF AD<SA OR AD>EA THEN
       {SPACE}300
PM 290 IF AD>511 AND AD<65280
       {SPACE}THEN PRINT BE$;:
       RETURN
SQ 300 GOSUB 950:PRINT"{RVS} I
       NVALID ADDRESS {DOWN}
       {BLK}":AD=0:RETURN
RD 310 CK=FNHB(AD):CK=AD-Z4*CK
       +Z5*(CK>Z7):GOTO 330
DD 320 CK=CK*Z2+Z5*(CK>Z7)+A
AH 330 CK=CK+Z5*(CK>Z5):RETURN
QD 340 PRINT BE$;"{RVS} ENTER
       {SPACE}DATA ":GOSUB 250
       :IF A$=NL$ THEN 220
JA 350 BANK 0:PRINT:F=0:OPEN 3
       ,3
BR 360 GOSUB 310:PRINT HEX$(AD
       )+":";:IF F THEN PRINT
       {SPACE}L$:PRINT"{UP}
       {5 RIGHT}";
QA 370 FOR I=0 TO 24 STEP 3:B$
       =SP$:FOR J=1 TO 2:IF F
       {SPACE}THEN B$=MID$(L$,
       I+J,1)
PS 380 PRINT"{RVS}"B$+LF$;:IF
       {SPACE}I<24 THEN PRINT"
       {OFF}";
RC 390 GETKEY A$:IF (A$>"/" AN
       D A$<":") OR(A$>"@" AND
        A$<"G") THEN 470
AC 400 IF A$="+" THEN A$="E":G
       OTO 470
QB 410 IF A$="-" THEN A$="F":G
       OTO 470
FB 420 IF A$=RT$ AND ((I=0) AN
       D (J=1) OR F) THEN PRIN
       T B$;:J=2:NEXT:I=24:GOT
       O 480
RD 430 IF A$="{HOME}" THEN PRI
       NT B$:J=2:NEXT:I=24:NEX
       T:F=0:GOTO 360
XB 440 IF (A$="{RIGHT}") AND F
        THEN PRINT B$+LF$;:GOT
       O 470
JP 450 IF A$<>LF$ AND A$<>DL$
       {SPACE}OR ((I=0) AND (J
       =1)) THEN GOSUB 950:GOT
       O 390
PS 460 A$=LF$+SP$+LF$:PRINT B$
       +LF$;:J=2-J:IF J THEN P
       RINT LF$;:I=I-3
GB 470 PRINT A$;:NEXT J:PRINT
       {SPACE}SP$;
HA 480 NEXT I:PRINT:PRINT"{UP}
       {5 RIGHT}";:L$="
       {27 SPACES}"
DP 490 FOR I=1 TO 25 STEP 3:GE
       T#3,A$,B$:IF A$=SP$ THE
       N I=25:NEXT:CLOSE 3:GOT
       O 220
BA 500 A$=A$+B$:A=DEC(A$):MID$
       (L$,I,2)=A$:IF I<25 THE
       N GOSUB 320:A(I/3)=A:GE
       T#3,A$
AR 510 NEXT I:IF A<>CK THEN GO
       SUB 950:PRINT:PRINT"
       {RVS} ERROR: REENTER LI
       NE ":F=1:GOTO 360
DX 520 PRINT BE$:B=BS+AD-SA:FO
       R I=0 TO 7:POKE B+I,A(I
       ):NEXT I
XB 530 F=0:AD=AD+8:IF AD<=EA T
       HEN 360
CA 540 CLOSE 3:PRINT"{DOWN}
       {BLU}** END OF ENTRY **
       {BLK}{2 DOWN}":GOTO 650
MC 550 PRINT BE$;"{CLR}{DOWN}
       {RVS} DISPLAY DATA ":GO
       SUB 250:IF A$=NL$ THEN
       {SPACE}220
JF 560 BANK 0:PRINT"{DOWN}
       {BLU}PRESS: {RVS}SPACE
       {OFF} TO PAUSE, {RVS}RE
       TURN{OFF} TO BREAK{4}
       {DOWN}"
XA 570 PRINT HEX$(AD)+":";:GOS
       UB 310:B=BS+AD-SA
DJ 580 FOR I=B TO B+7:A=PEEK(I
       ):PRINT RIGHT$(HEX$(A),
       2);SP$;:GOSUB 320:NEXT
       {SPACE}I
XB 590 PRINT"{RVS}";RIGHT$(HEX
       $(CK),2)
GR 600 F=1:AD=AD+8:IF AD>EA TH
       EN PRINT"{BLU}** END OF
        DATA **":GOTO 220
EB 610 GET A$:IF A$=RT$ THEN P
       RINT BE$:GOTO 220
QK 620 IF A$=SP$ THEN F=F+1:PR
       INT BE$;
XS 630 ON F GOTO 570,610,570
RF 640 PRINT BE$"{DOWN}{RVS} L
       OAD DATA ":OP=1:GOTO 66
       0
BP 650 PRINT BE$"{DOWN}{RVS} S
       AVE FILE ":OP=0
DM 660 F=0:F$=NL$:INPUT"FILENA
       ME{4}";F$:IF F$=NL$ THE
       N 220
PF 665 IF LEN(F$)>14 THEN 660
RF 670 PRINT"{DOWN}{BLK}{RVS}T
       {OFF}APE OR {RVS}D{OFF}
       ISK: {4}";
SQ 680 GETKEY A$:IF A$="T" THE
       N 850:ELSE IF A$<>"D" T
       HEN 680
SP 690 PRINT"DISK{DOWN}":IF OP
        THEN 760
EH 700 DOPEN#1,(F$+",P"),W:IF
       {SPACE}DS THEN A$=D$:GO
       TO 740
JH 710 BANK 0:POKE BS-2,FNLB(S
       A):POKE BS-1,FNHB(SA):P
       RINT"SAVING ";F$:PRINT
MC 720 FOR A=BS-2 TO BS+EA-SA:
       PRINT#1,CHR$(PEEK(A));:
       IF ST THEN A$="DISK WRI
       TE ERROR":GOTO 750
GC 730 NEXT A:CLOSE 1:PRINT"
       {BLU}** SAVE COMPLETED
       {SPACE}WITHOUT ERRORS *
       *":GOTO 220
RA 740 IF DS=63 THEN BEGIN:CLO
       SE 1:INPUT"{BLK}REPLACE
        EXISTING FILE [Y/N]{4}
       ";A$:IF A$="Y" THEN SCR
       ATCH(F$):PRINT:GOTO 700
       :ELSE PRINT"{BLK}":GOTO
        660:BEND
GA 750 CLOSE 1:GOSUB 950:PRINT
       "{BLK}{RVS} ERROR DURIN
       G SAVE: {4}":PRINT A$:G
       OTO 220
FD 760 DOPEN#1,(F$+",P"):IF DS
        THEN A$=DS$:F=4:CLOSE
       {SPACE}1:GOTO 790
```

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```
PX 770 GET#1,A$,B$:CLOSE 1:AD=
       ASC(A$)+256*ASC(B$):IF
       {SPACE}AD<>SA THEN F=1:
       GOTO 790
KB 780 PRINT"LOADING ";F$:PRIN
       T:BLOAD(F$),B0,P(BS):AD
       =SA+FNAD(174)-BS-1:F=-2
       *(AD<EA)-3*(AD>EA)
RQ 790 IF F THEN 800:ELSE PRIN
       T"{BLU}** LOAD COMPLETE
       D WITHOUT ERRORS **":GO
       TO 220
ER 800 GOSUB 950:PRINT"{BLK}
       {RVS} ERROR DURING LOAD
       : {4}":ON F GOSUB 810,8
       20,830,840:GOTO220
QJ 810 PRINT"INCORRECT STARTIN
       G ADDRESS (";HEX$(AD);"
       )":RETURN
DP 820 PRINT"LOAD ENDED AT ";H
       EX$(AD):RETURN
EB 830 PRINT"TRUNCATED AT ENDI
       NG ADDRESS ("HEX$(EA)")
       ":RETURN
FP 840 PRINT"DISK ERROR ";A$:R
       ETURN
KS 850 PRINT"TAPE":AD=POINTER(
       F$):BANK 1:A=PEEK(AD):A
       L=PEEK(AD+1):AH=PEEK(AD
       +2)
XX 860 BANK 15:SYS DEC("FF68")
       ,0,1:SYS DEC("FFBA"),1,
       1,0:SYS DEC("FFBD"),A,A
       L,AH:SYS DEC("FF90"),12
       8:IF OP THEN 890
FG 870 PRINT:A=SA:B=EA+1:GOSUB
        920:SYS DEC("E919"),3:
       PRINT"SAVING ";F$
AB 880 A=BS:B=BS+(EA-SA)+1:GOS
       UB 920:SYS DEC("EA18"):
       PRINT"{DOWN}{BLU}** TAP
       E SAVE COMPLETED **":GO
       TO 220
CP 890 SYS DEC("E99A"):PRINT:I
       F PEEK(2816)=5 THEN GOS
       UB 950:PRINT"{DOWN}
       {BLK}{RVS} FILE NOT FOU
       ND ":GOTO 220
GQ 900 PRINT"LOADING ...{DOWN}
       ":AD=FNAD(2817):IF AD<>
       SA THEN F=1:GOTO 800:EL
       SE AD=FNAD(2819)-1:F=-2
       *(AD<EA)-3*(AD>EA)
JD 910 A=BS:B=BS+(EA-SA)+1:GOS
       UB 920:SYS DEC("E9FB"):
       IF ST>0 THEN 800:ELSE 7
       90
XB 920 POKE193,FNLB(A):POKE194
       ,FNHB(A):POKE 174,FNLB(
       B):POKE 175,FNHB(B):RET
       URN
CP 930 CATALOG:PRINT"{DOWN}
       {BLU}** PRESS ANY KEY F
       OR MENU **":GETKEY A$:G
       OTO 220
MM 940 PRINT BE$"{RVS} QUIT
       {4}";RT$;"ARE YOU SURE
       {SPACE}[Y/N]?":GETKEY A
       $:IF A$<>"Y" THEN 220:E
       LSE PRINT"{CLR}":BANK 1
       5:END
JE 950 SOUND 1,500,10:RETURN
AF 960 IF ER=14 AND EL=260 THE
       N RESUME 300
MK 970 IF ER=14 AND EL=500 THE
       N RESUME NEXT
KJ 980 IF ER=4 AND EL=780 THEN
        F=4:A$=DS$:RESUME 800
DQ 990 IF ER=30 THEN RESUME:EL
       SE PRINT ERR$(ER);" ERR
       OR IN LINE";EL
```

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The Automatic Proofreader

Philip I. Nelson

"The Automatic Proofreader" helps you type in program listings for the 128, 64, Plus/4, and 16 and prevents nearly every kind of typing mistake.

Type in the Proofreader *exactly* as listed. Since the program can't check itself, type carefully to avoid mistakes. Don't omit any lines, even if they contain unfamiliar commands. After finishing, save a copy or two on disk or tape before running it. This is important because the Proofreader erases the BASIC portion of itself when you run it, leaving only the machine language portion in memory.

Next, type RUN and press RETURN. After announcing which computer it's running on, the Proofreader displays the message "Proofreader Active". Now you're ready to type in a BASIC program.

Every time you finish typing a line and press RETURN, the Proofreader displays a two-letter checksum in the upper-left corner of the screen. Compare this result with the two-letter checksum printed to the left of the line in the program listing. If the letters match, it's almost certain the line was typed correctly. If the letters don't match, check for your mistake and correct the line.

The Proofreader ignores spaces not enclosed in quotes, so you can omit or add spaces between keywords and still see a matching checksum. However, since spaces inside quotes are almost always significant, the Proofreader pays attention to them. For example, **10 PRINT"THIS IS BASIC"** will generate a different checksum than **10 PRINT"THIS ISBA SIC"**.

A common typing error is transposition—typing two successive characters in the wrong order, like PIRNT instead of PRINT or 64378 instead of 64738. The Proofreader is sensitive to the *position* of each character within the line and thus catches transposition errors.

The Proofreader does *not* accept keyword abbreviations (for example, ? instead of PRINT). If you prefer to use abbreviations, you can still check the line by LISTing it after typing it in, moving the cursor back to the line, and pressing RETURN. LISTing the line substitutes the full keyword for the abbreviation and allows the Proofreader to work properly. The same technique works for rechecking programs you've already typed in.

If you're using the Proofreader on the Commodore 128, Plus/4, or 16, *do not perform any GRAPHIC commands while the Proofreader is active.* When you perform a command like GRAPHIC 1, the computer moves everything at the start of BASIC program space—including the Proofreader—to another memory area, causing the Proofreader to crash. The same thing happens if you *run* any program with a GRAPHIC command while the Proofreader is in memory.

Though the Proofreader doesn't interfere with other BASIC operations, it's a good idea to disable it before running another program. However, the Proofreader is purposely difficult to dislodge: It's not affected by tape or disk operations, or by pressing RUN/STOP– RESTORE. The simplest way to disable it is to turn the computer off then on. A gentler method is to SYS to the computer's built-in reset routine (SYS 65341 for the 128, 64738 for the 64, and 65526 for the Plus/4 and 16). These reset routines erase any program in memory, so be sure to save the program you're typing in before entering the SYS command.

If you own a Commodore 64, you may already have wondered whether the Proofreader works with other programming utilities like "MetaBASIC." The answer is generally yes, *if you're using a 64 and activate the Proofreader after installing the other utility.* For example, first load and activate MetaBASIC, then load and run the Proofreader.

When using the Proofreader with another utility, you should disable *both* programs before running a BASIC program. While the Proofreader seems unaffected by most utilities, there's no way to promise that it will work with any and every combination of utilities you might want to use. The more utilities activated, the more fragile the system becomes.

The New Automatic Proofreader

```
10 VEC=PEEK(772)+256*PEEK(773)
   :LO=43:HI=44
20 PRINT "AUTOMATIC PROOFREADE
   R FOR ";:IF VEC=42364 THEN
   {SPACE}PRINT "C-64"
30 IF VEC=50556 THEN PRINT "VI
   C-20"
40 IF VEC=35158 THEN GRAPHIC C
   LR:PRINT "PLUS/4 & 16"
50 IF VEC=17165 THEN LO=45:HI=
   46:GRAPHIC CLR:PRINT"128"
60 SA=(PEEK(LO)+256*PEEK(HI))+
   6:ADR=SA
70 FOR J=0 TO 166:READ BYT:POK
   E ADR,BYT:ADR=ADR+1:CHK=CHK
   +BYT:NEXT
80 IF CHK<>20570 THEN PRINT "*
   ERROR* CHECK TYPING IN DATA
    STATEMENTS":END
90 FOR J=1 TO 5:READ RF,LF,HF:
   RS=SA+RF:HB=INT(RS/256):LB=
   RS-(256*HB)
100 CHK=CHK+RF+LF+HF:POKE SA+L
   F,LB:POKE SA+HF,HB:NEXT
110 IF CHK<>22054 THEN PRINT "
   *ERROR* RELOAD PROGRAM AND
   {SPACE}CHECK FINAL LINE":EN
   D
120 POKE SA+149,PEEK(772):POKE
    SA+150,PEEK(773)
130 IF VEC=17165 THEN POKE SA+
   14,22:POKE SA+18,23:POKESA+
   29,224:POKESA+139,224
140 PRINT CHR$(147);CHR$(17);"
   PROOFREADER ACTIVE":SYS SA
150 POKE HI,PEEK(HI)+1:POKE (P
   EEK(LO)+256*PEEK(HI))-1,0:N
   EW
160 DATA 120,169,73,141,4,3,16
   9,3,141,5,3
170 DATA 88,96,165,20,133,167,
   165,21,133,168,169
180 DATA 0,141,0,255,162,31,18
   1,199,157,227,3
190 DATA 202,16,248,169,19,32,
   210,255,169,18,32
200 DATA 210,255,160,0,132,180
   ,132,176,136,230,180
210 DATA 200,185,0,2,240,46,20
   1,34,208,8,72
220 DATA 165,176,73,255,133,17
   6,104,72,201,32,208
230 DATA 7,165,176,208,3,104,2
   08,226,104,166,180
240 DATA 24,165,167,121,0,2,13
   3,167,165,168,105
250 DATA 0,133,168,202,208,239
   ,240,202,165,167,69
260 DATA 168,72,41,15,168,185,
   211,3,32,210,255
270 DATA 104,74,74,74,74,168,1
   85,211,3,32,210
280 DATA 255,162,31,189,227,3,
   149,199,202,16,248
290 DATA 169,146,32,210,255,76
   ,86,137,65,66,67
300 DATA 68,69,70,71,72,74,75,
   77,80,81,82,83,88
310 DATA 13,2,7,167,31,32,151,
   116,117,151,128,129,167,136
   ,137
```

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Please enclose an SASE if you wish to have the materials returned.

Articles are reviewed within four weeks of submission.

How To Type In *COMPUTE!'s Gazette* Programs

Each month, COMPUTE!'s Gazette publishes programs for the Commodore 128, 64, Plus/4, and 16. Each program is clearly marked by title and version. Be sure to type in the correct version for your machine. All 64 programs run on the 128 in 64 mode. Be sure to read the instructions in the corresponding article. This can save time and eliminate any questions which might arise after you begin typing.

We frequently publish two programs designed to make typing easier: The Automatic Proofreader, and MLX, designed for entering machine language programs.

When entering a BASIC program, be especially careful with DATA statements as they are extremely sensitive to errors. A mistyped number in a DATA statement can cause your machine to "lock up" (you'll have no control over the computer). If this happens, the only recourse is to turn your computer off then on, erasing what was in memory. So be sure to *save a program before you run it.* If your computer crashes, you can always reload the program and look for the error.

Special Characters

Most of the programs listed in each issue contain special control characters. To facilitate typing in any programs from the *Gazette*, use the following listing conventions.

The most common type of control characters in our listings appear as words within braces: {DOWN} means to press the cursor down key; {5 SPACES} means to press the space bar five times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing another key), the character is underlined. For example, A means hold down the SHIFT key and press A. You may see strange characters on your screen, but that's to be expected. If you find a number followed by an underlined key enclosed in braces (for example, {8 A}), type the key as many times as indicated (in our example, enter eight SHIFTed A's).

If a key is enclosed in special brackets, [ ], hold down the Commodore key (at the lower left corner of the keyboard) and press the indicated character.

Rarely, you'll see a single letter of the alphabet enclosed in braces. This can be entered on the Commodore 64 by pressing the CTRL key while typing the letter in braces. For example, {A} means to press CTRL-A.

The Quote Mode

Although you can move the cursor around the screen with the CRSR keys, often a programmer will want to move the cursor under program control. This is seen in examples such as {LEFT}, and {HOME} in the program listings. The only way the computer can tell the difference between direct and programmed cursor control is *the quote mode.*

Once you press the quote key, you're in quote mode. This mode can be confusing if you mistype a character and cursor left to change it. You'll see a reverse video character (a graphics symbol for cursor left). In this case, you can use the DELete key to back up and edit the line. Type another quote and you're out of quote mode. If things really get confusing, you can exit quote mode simply by pressing RETURN. Then just cursor up to the mistyped line and fix it.

When You Read:	Press:	See:
{CLR}	SHIFT + CLR/HOME	
{HOME}	CLR/HOME	
{UP}	SHIFT + ↑ CRSR ↓	
{DOWN}	↑ CRSR ↓	
{LEFT}	SHIFT + ←CRSR→	
{RIGHT}	←CRSR→	
{RVS}	CTRL + 9	
{OFF}	CTRL + 0	
{BLK}	CTRL + 1	
{WHT}	CTRL + 2	
{RED}	CTRL + 3	
{CYN}	CTRL + 4	

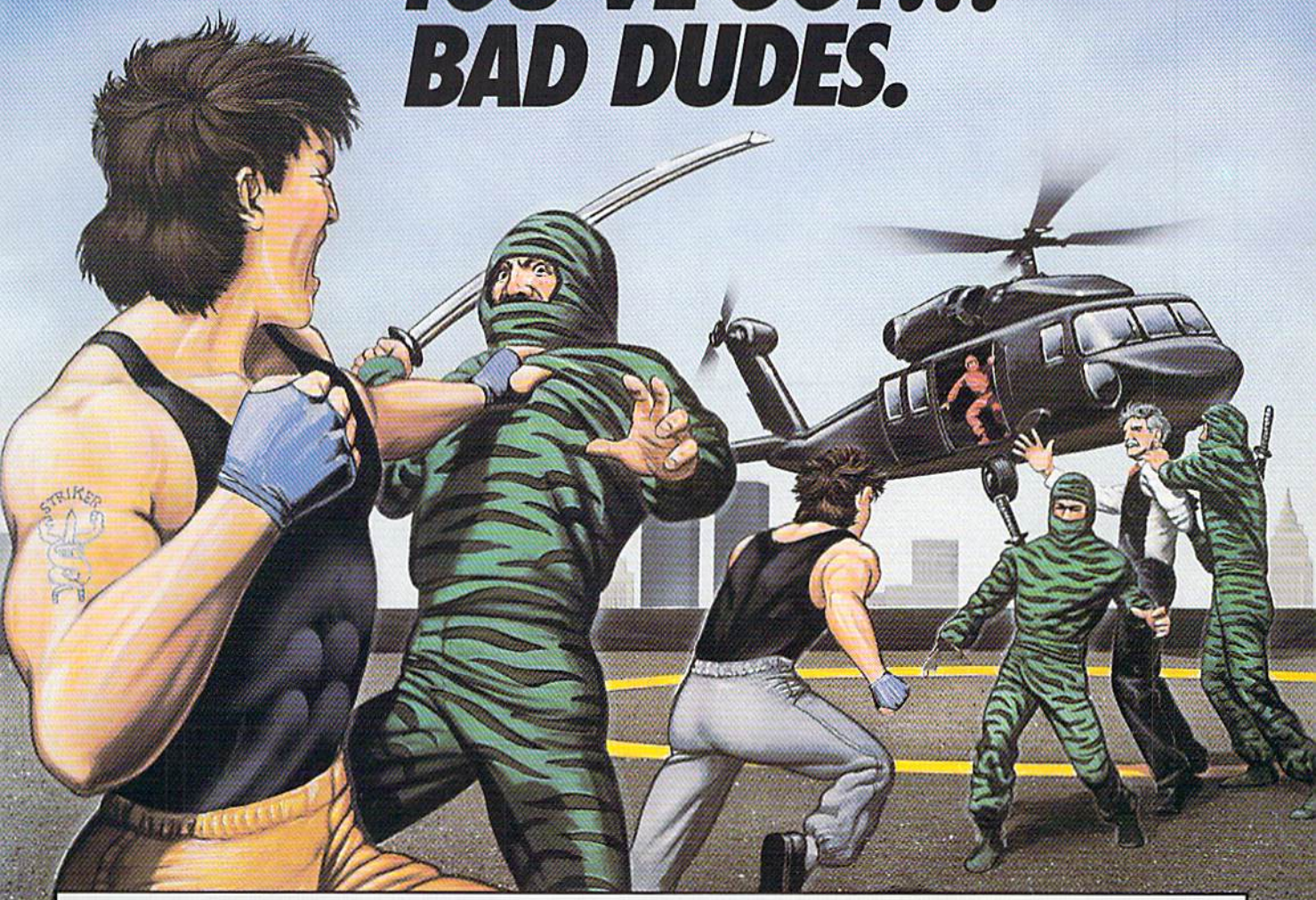
When You Read:	Press:	See:
{PUR}	CTRL + 5	
{GRN}	CTRL + 6	
{BLU}	CTRL + 7	
{YEL}	CTRL + 8	
{ F1 }	f1	
{ F2 }	SHIFT + f1	
{ F3 }	f3	
{ F4 }	SHIFT + f3	
{ F5 }	f5	
{ F6 }	SHIFT + f5	
{ F7 }	f7	
{ F8 }	SHIFT + f7	

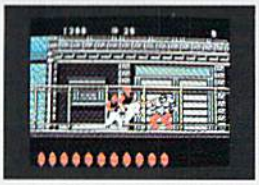
When You Read:	Press:	See:
←	←	
↑	SHIFT + ↑	

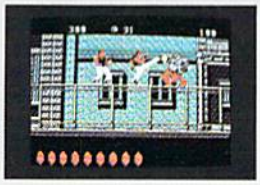
For Commodore 64 Only

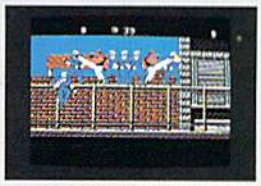
[1]	COMMODORE + 1	
[2]	COMMODORE + 2	
[3]	COMMODORE + 3	
[4]	COMMODORE + 4	
[5]	COMMODORE + 5	
[6]	COMMODORE + 6	
[7]	COMMODORE + 7	
[8]	COMMODORE + 8	

THEY'VE GOT THE PRESIDENT. YOU'VE GOT... BAD DUDES.









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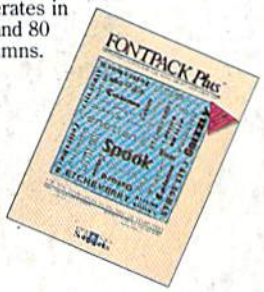

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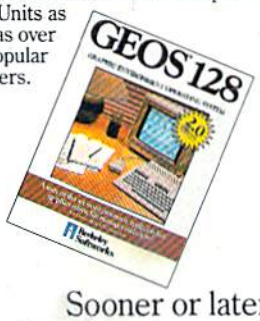

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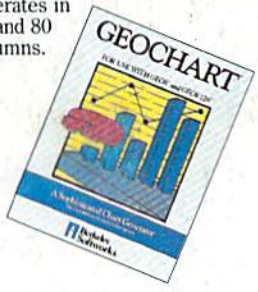

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